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The Effect of Temporal Distance on Predictions of Duration

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Table of Contents

Table of Tables and Figures

Abstract

Construal-level theory (Trope & Liberman, 2010) states that people use increasingly higher levels of abstraction to represent a mental object, as the psychological distance to the object increases. Kanten (2011) investigated during a series of experiments the role of construal-level in prediction of time needed to perform a task. The results revealed an increase of task duration estimates when moving up in construal-level. A time contraction mechanism has been proposed as a possible explanation for the observed increase of estimates. Time shrinks when people are moving up in abstraction, consequentially more time is needed to cover the same amount of work. The main objective of the present research was to replicate Kanten's findings of increasing task duration estimates as a function of moving up in abstraction. This was achieved by investigating whether the findings would prevail for estimates of tolerance for delays, for affective durations, and for task durations in an anchoring paradigm. During three experiments, participants induced with temporal distance were instructed to estimate task durations (experiment 1), tolerance for delays (experiment 2), and affective durations (experiment 3). The results showed a consistent increase of the durations estimates over temporal distance. When comparing two task durations in the distant future, they appear more similar as a consequence of time contraction (experiment 2). The discussions centers around the contraction of time as a function of psychological distance, and how changes in time perception influence peoples predictions of duration estimates.

The Effect of Temporal Distance on Predictions of Duration

Introduction

People make predictions about future realities in everyday life, still belonging to the imagination, far away from being manifested in the present reality. The innate capacity to envision distant places in other times, to consider hypothetical scenarios, or taking the perspectives of others, represents intrinsic human qualities. For instance, being able to take the perspective of another person is essential to understand how he or she feels. Conversely, we normally try to work out how we are viewed by others by thinking about how we see ourselves, then making a prediction from that. Moreover, probabilities convey a sense of distance, as well. A lot of people are buying lottery tickets even though only the few can strike the jackpot. There is a remote probability of winning, but there are no serious consequences associated with losing either. On the other hand, when taking a flight, safety will be paramount, a high likelihood for success must be guaranteed. Furthermore, when planning for a trivial weekend trip in the near future, or a deciding where to move to and settle down in the distant future, are choices that represent both temporal as well as spatial distance from the experienced self in the here-and-now.

How do we transcend the present moment to include future as well as past events, other people's perspective or hypothetical situations? According to Construal-level theory (Trope & Liberman, 2003) we do so by forming abstract mental construals of distal objects. Our ability to remember the past, to take the perspective of others, and to confabulate about future possibilities are distinct from the here-and-now. During everyday activities, people constantly transcend the immediate by thinking about distal objects, places, and events. The different forms of distance have the common starting point in ongoing experience. Thus, remembering a past holiday or contemplating about what a colleague might think of you, represents distal experiences and imaginations, introspectively linked to the egocentric reference point of the observer. Time, space, social distance and hypothetically therefore represent different dimensions where mental objects are represented by construal-level (Trope & Liberman, 2010). As psychological distance increases, the construal will become increasingly more abstract, and vice versa. Since the proposed dimensions have the same subjective reference point within the observer, construals on one dimension should equally affect the other dimensions. By contemplating about the outer reaches of space the observer transcends into an abstract high level mindset broadening the perspective, whereas thinking about relatively recent episode, e.g., yesterdays dinner, contracts the mindset. The contraction and expansions of ones mental horizon transforms the ever-changing construal-level.

Seen from the egocentric reference point of the self, time is perceived as an *elastic* construct.

These conceptions are well known from a layperson's perspective too. The sense of time floating by as life passes on, is perceived differently with age (Wittmann & Lehnhoff, 2005), when having fun, as opposed to when tedious and boring tasks needs to be fulfilled (Kellaris & Kent, 1992), or moments with lots of activity, in comparison to the inertia of time when doing nothing (Ahn, Liu, & Soman, 2009). The nature of subjective time perception can therefore be seen as an underlying factor for a host of potential misjudgments when predicting durations.

Past research has revealed that estimations of task durations will increase as a function of psychological distance. In a series of studies this was investigated by either priming participants with high or low-level construals, before instructing them to estimate task durations (Kanten, 2011; study 1-3). Kanten suggested the observed increase in duration estimates, when moving up in construal-level, was a result of the contraction of time. Kanten further contended that the object like quality of the task will shrink at a slower pace over temporal distance, than the malleable character of time, causing its perceived contraction. When the subjective time unit shrinks as a function of temporal distance, the amount of units needed to cover the task in the future, as compared to the present, will subjectively need to increase in order cover the same task. Furthermore, to directly test the actual shrinkage of time across distance conditions, participants were instructed to measure the length of one hour, by drawing its length (Kanten, 2011; study 4). As suspected, the results revealed that an hour was drawn to be shorter as a consequence of moving up in construal level. Since the effect of time contraction operates outside people's awareness, the shrinkage of time will increase the chances for obtaining errors, when predicting duration estimates for future endeavors. A minute in the present is subjectively treasured more than the same amount of time in a year. As a consequence, a task will typically be predicted to span for a longer duration in the distant rather than proximal future.

The main agenda of the present research is to (1) replicate Kanten's (2011) studies on temporal distance and task duration estimates in an anchoring paradigm. Anchoring has since its introduction by Tversky and Kahneman (1974) proven to be an extremely robust psychological phenomena. By adding anchors to the original design, this study can also be considered as an examination of the strength and generalizability of the original findings. Furthermore, (2) the time contraction mechanism, contends that two task duration estimates will look more similar as a function of temporal distance. The second experiment will test out the validity of this claim. Lastly, (3) the third experiment investigates whether predictions of affect duration increase as a function of temporal distance as well. Affective forecasting is a major research tradition within social psychology. There is a great tendency for people to overestimate the intensity and duration, of both positive and negative emotions, when predicting the influence they will exert in the future (Wilson

& Gilbert, 2003). However, the present research is to the author's knowledge the first to investigate the effect of temporal distance, in relation to emotional intensity and duration. Overall, the main objective for the current research is to investigate the relation between how subjective time contracts as a function of temporal distance and level of construal, and how this is reflected in people's duration estimates. In the following, we briefly review past research relating to construal-level theory, the planning fallacy, and affective forecasting. Chapters on affective forecasting and the planning fallacy will contain relevant material in relation to construal-level.

Construal-level theory of psychological distance

The association between distance and construal level has been shown to play an important role in different kinds of judgments, more specifically; primary versus secondary features of choice and evaluation (Trope & Liberman, 2000), comparisons (e.g., Wakslak & Trope, 2009), pros and cons (Liberman, Eyal, Trope, & Walther, 2004), values and moral principles (Eyal, Liberman, & Trope, 2008), and predictions (e.g., Wilson & Gilbert, 2003). Past research pertaining to comparisons and predictions, will be of special interest to the present study, and in particular evidence associated with these areas will be given weight throughout the text.

Level of construal

High level construals are abstract, coherent and superordinate, whereas low level construals are concrete, contextualized and subordinate. As the observer expands the mental horizon details are omitted, making the construal more abstract and less contextualized (Liberman & Trope, 2008).

Since abstract superordinate representations can represent a myriad of concrete subordinate representations, they tend to leave out incidental details. Therefore they represent less complexity, and are more prototypical than concrete representations. Liberman et al. (2002) hypothesized that people would use fewer and broader categories to classify objects that belong to distant future situations. Participants imagined themselves in various situations (e.g., having a yard sale) in either the near future or the distant future and classified the objects related to each situation (e.g., clothes, books, CDs) into as many categories as they thought appropriate. When participants imagined a distant future event, compared to a near future event, they found that objects were categorized into fewer and broader categories.

In a subsequent study, Liberman et al. (2002) predicted that future good or bad days, would consist of prototypically positive or negative experiences, since prototypic construals are more likely to be applied to distant future experiences. Moreover, Liberman et al. instructed the participants to imagine a good or a bad day in the near or distant future, and list events happening

that particular day. For distant future days, the results revealed less diverse experiences within each type of day, such that the good and the bad days were more prototypical, extreme, and distinct from each other. Taken together, the evidence suggests that temporal distance systematically changes the way objects and events are represented, such that a distant future is represented more schematic and coherently.

Psychological distance

As noted above, CLT states that people use increasingly higher levels of construal to represent an object as the psychological distance to the object increases. From a psychologically distant perspective it is more useful to construe an action in terms of a high level construal. High level construals have evolved to represent distal objects, since distance conserves the invariant properties. Liberman et al. (2002) found that a set of items were classified into fewer, broader and more abstract categories, when the items belonged to more future activities. On the other hand, low-level construals represent the object in exact detail in a particular time or place. Ledgerwood, Trope, & Chaiken, 2010 and Ledgerwood, Trope, & Liberman, 2010 have provided evidence for the greater flexibility of proximal mental objects, whereas distal objects support consistency. Since individuals construe near objects more concretely, these objects tend to incorporate context dependent information unique for the actual situation. On the other hand, since distal objects are construed more abstractly, their evaluations will be more independent of the surrounding social context. In line with this reasoning, participants primed to adopt a concrete mindset subsequently evaluated an issue (policy) more favorably when the interaction partner supported it, whereas participants primed to adopt an abstract mindset, made evaluations that were unaffected by the social context. That is, when adopting a concrete mindset their evaluations were flexibly incorporating the attitudes of the stranger, while being in an abstract mindset, led their evaluations to be more resistant towards other peoples attitudes. Instead the abstract mindset reflected the participants previously reported ideological values. Seen from this perspective, high and low-level construals will produce more or less stability in mental representations.

Interrelation of distances

If there is a common dimension of psychological distance underlying space, time, social distance, and hypotheticality, these dimensions should be mentally associated. That is, the outer reaches of space should bring to mind distant memories of the past, improbable situations, or different others. Whereas, thinking about your close relative living nearby, should bring to mind close places and likely encounters. Past research has shown that the different psychological

distances are interrelated to each other, thus a certain psychological distance on one dimension should affect the perceived distance on another dimension. Bar-Anan, Liberman, Trope, & Algom (2007) provided evidence for this hypothesis by testing automatic activation of words conveying temporal distance, spatial distance, social distance and hypotheticality. This was achieved by showing words on a computer screen either close to or further away from the participant. When the words meaning and its spatial location on the screen were congruent, reaction times were significantly lower than when they were incongruent. For instance, geographically close words were classified faster when it was *friend,* than when in was *enemy*. For geographically distant words the opposite were true. The study provided support across all four distance dimensions, showing their interrelation across psychological distance are accessed automatically.

Furthermore, the interrelation of the psychological distance dimensions was investigated by exploring how temporal and spatial distance affected social distance (Stephan, Liberman, & Trope, 2010). Politeness has been shown to regulate social distance. People usually show more politeness towards strangers than friends, and polite language creates a sense of social distance between people. Thus, politeness was predicted to be related to temporal distance as well as spatial distance. Stephan et al. provided evidence for more polite actions towards others when participants primed to adopt a high level mindset. Moreover, if others were addressed in a polite language the participants inferred that they were situated geographically more distant, than when addressed in colloquial terms. When testing for the effects of politeness on temporal distance, an identical pattern was revealed. Colloquial language decreased spatial distance, while polite language led participants to believe that the others were situated in a remote location, supporting the claim of the interrelations between the psychological distance dimensions.

Psychological distance and level of construal

Construal level theory has provided evidence for a reciprocal link between psychological distance and level of construal. Psychological distance will induce high level construals, likewise high level construals will represent distal objects. From a perceptual viewpoint, people have the capacity to move closer, and get a narrow detailed view of the object, or stepping back to get an overview. Liberman and Förster (2009) tested the assumption that abstract construals impacts people's perception of spacial distance. Across four different experiments, participants primed to adopt a high level mindset, judged temporal distances to be longer, spatial distances to be greater, social distance to be larger, and distal events were perceived to be less probable. Induction of a low level mindset had the opposite effect. Psychological distance across all four dimensions was in comparison judged to be shorter. These findings show interactions between perceptual stimuli and

internal conceptual representation.

There has also been collected evidence for the association between distance and level of construal on a pure conceptual level. Bar-Anan, Liberman, & Trope (2006) accomplished this by using an implicit association test to demonstrate associations between words related to construal level (low versus high), and words related to the four dimensions of distance (near versus distant). Participants responded faster in congruent trials where distance and construal represented a pairing, (e.g., tomorrow (closeness) and potato (exemplar)), than in incongruent trials (e.g., next year and potato)). Automatic associations between distance and construal-level were achieved across all four distance dimensions of space, time, social distance and hypotheticality, without the need for conscious thought, providing evidence for the reciprocal link between psychological distance and level of construal.

Construal-level and perception of time

A high-level construal conveys more distance than a low level construal, thereby imposing a broader perspective. An abstraction of objects, places and events will provide them with stable properties across a wide array of times, situations, and individuals (Trope & Liberman, 2010). A parrot living in the wild refers to a concrete exemplar of bird, constrained to certain habitats around the world. On the contrary, a bird, irrespective of species, can be found on every part of the globe. A high level construal is therefore associated with taking a distant perspective, focusing on the big picture. In accordance with these assumptions Liberman and Förster (2009) investigated the effect of psychological distance on the level of perceptual construal using a Navon paradigm (global letters composed of local letters) (Navon, 1977). Thinking of more distant events, either temporally, spatially, or socially, made participants respond faster to global letters and respond slower to local letters. Thinking of more proximal events had the opposite effect.

When adopting a broad perspective the details are less relevant, while a close up view would obscure the broad perspective. The relation between construal-level and level of detail will need to be on par for accurate time perception. Maglio and Trope (2011) found that larger unit of measurement arises as a consequence of greater spatial distance from a given target to the observer. When two points on a map were described distant rather than near, this invoked a larger unit of measurement for the participants. In relation to temporal distance, this signifies that the vast time horizon of a year's time associated with a high-level construal, will impose a larger preferred unit of measurement when perceiving time, whereas low-level construal will impose a smaller time unit in comparison. This has implications for people's time perception. When time is viewed within a narrow horizon – how long until lunch hour, minutes would represent a good fit. On the other hand,

viewed within a broad timeframe – a countdown to the next year's holiday trip would demand weeks or months as the sensible unit of measurement. To measure a years time in the order of minutes would not provide a satisfying understanding for the perceiver, just an annoyingly large number devoid of meaning. However, at a high level of abstraction, weeks would provide time intervals better suited to cope with the vastness of a year's time. To conclude, if the unit of measurement is too detached from the perceiver's current timeframe, it would be rendered conceptually irrelevant. The act of zooming in or out as a consequence of construal-level, alters the preferred unit of measurement, such that it grows or shrinks as a function of temporal distance.

Since subjective time alters across psychological distance, this has implications for how people estimate task durations. Writing a summary of a chapter, or renovating a house will *objectively* need the same amount of time in the present as in a year from now. Off course the length of one clock hour spans the same interval now as in the future, but time is more exposed to subjective changes in perception. Kanten (2011) conducted a series of studies revealing that task duration estimates increased as a function of temporal distance. As a possible explanation for the discrepancy between the estimates in the near and distant future, a time contraction mechanism was proposed. Kanten theorized that from an observer's standpoint – even though both task and time will be subject to alteration over temporal distance, the perception of the object like quality of a task will be relatively static, whereas the perception of time is more malleable. The task will preserve its constitution to a greater extent, compared to the time horizon embracing the task. Kanten further contended that the contraction or expansion of time in relation to the task cannot be perceived in an absolute sense. Instead, it is a relative process; time shrinks at a quicker pace as function of distance and construal-level, compared to tasks. Moreover, direct evidence for the contraction of time were gathered, by asking people to draw the length of one hour, showing significant differences between construal-level manipulations (Kanten, 2011; study 4).

Past research on time predictions

The planning fallacy

People's tendency to underestimate how much time they need to complete a future task is often referred to as the planning fallacy. Even for tasks executed numerous times in the past, a large margin of error exists, due to the unpredictability of future events. The underestimation of task completion times has been found when predicting a wide variety of tasks, such as furniture assembly (Byram, 1997), academic projects (Sanna, Parks, Chang, & Carter, 2005), and large scale software projects (Moløkken-Østvold et al., 2004). The examples of costly overruns are abundant in the scientific literature. Peoples overly optimistic outlook about their future activities were captured

in a study conducted by Buehler, Griffin, & Peetz (2010). In this study, Canadian tax payers submitted the tax returns a week later than previously predicted. They had no misconceptions about their past record of late deliveries, but expected to improve by delivering the tax form more quickly next time. The recurring theme of the planning fallacy is therefore people's acknowledgement of past mistakes, while at the same time exhibiting optimism for future tasks equal in nature.

Several factors contribute to this phenomenon. Buehler, Griffin, & Ross (1994) identified two important factors: A motivational one, were people engage in wishful thinking, failing to see the obstacles lying ahead of the solution. A cognitive one, whereby people not emphasize sufficiently past experience of similar tasks, and instead focusing too much on simple step-by-step plans for successful task completion (Buehler, Griffin, & MacDonald, 1997).

Cognitive and motivational processes

Past research on the planning fallacy reveals that when people think about when they will accomplish a future task, they fail to incorporate their past experiences on similar tasks. For instance, when people are trying to figure out task completion times, they often engage in wishful thinking, failing to consider past experience is a contributing source for mispredictions. For instance, Buehler et al. (1997) examined the impact of motivation on predicted and actual completion times for completing income tax forms. They reasoned that those individuals expecting refund presumably have relatively strong motive to submit their forms early and receive an early payment. Buehler et al. expected that this motive would affect people's predicted completion times, leading to a larger optimistic bias for those expecting a refund, than those not expecting a refund. Results revealed that the hopes of receiving an early tax refund, led individuals to predict that they would file their tax forms hastily. As expected, hopes of a refund led to greater optimistic bias. The difference between predicted completion times was greater for participants expecting a refund, than for those not expecting a refund. Thus, instead of remembering how long similar tasks took to complete, people have a tendency to think about when they intend and prefer to complete a task (Buehler et al., 1994; Buehler et al., 1997). A way of reducing the planning fallacy is therefore to explicitly ask people about completion times on similar tasks, and how past tasks bear similarities with the future tasks (Buehler et al., 2010).

However, remembering past experience will not necessarily suffice to improve estimation accuracy, since both remembered and predicted task duration are known causes for mispredictions (see Roy, Christenfeld, & McKenzie, 2005 for review). Past research has mainly cited the cause for the memory bias being due to memory not being used correctly, resulting in peoples overly optimistic outlook. The general trend of underestimating past task durations, will create biased

memories of the durations, that in turn may influence future planning. Roy et al. (2005) listed some important findings for peoples underestimation of task completion pointing towards a memory bias as the important cause. In particular, there is a similar tendency to underestimate both past as well as future durations. Moreover, the tendency for underestimation is greater for familiar tasks, than for novel tasks. Finally, factors that influence memory of duration, affect predictions of duration in the same way. Therefore, when people are basing their predictions of future task durations, they use their memories of how long past durations have been, but their memories are systematic underestimations of past duration. According to Roy et al., people seems to underestimate future task durations because they underestimate past task durations.

Another cause for mispredictions are peoples tendency to put too much emphasis on salient aspects of the task, thereby forgetting to consider other relevant aspects influencing on how long the task will take to complete. By forgetting to unpack a multifaceted main task into its constituents, people fail to see the overall complexity of the task. In turn, this will lead to optimistic task durations. Kruger and Evans (2004) asked participants for how long it would take them to complete several tasks, such as holiday shopping, getting ready for a date, formatting dictionary definitions etc. Participants prompted to unpack the task into its subcomponents provided longer, and less biased estimates of how long the task would take, than did participants who did not. By thinking through relevant, but smaller aspects of the task, instead of focusing solely on the dominant parts, served as debiasing and provided more accurate estimates. Moreover, when Kruger and Evans varied the complexity of the task, they found that unpacking was greater for participants undertaking a complex task, than for participants undertaking a simpler and less multifaceted task. Forsyth and Burt (2008) provided further evidence for the discrepancy between treating the task as a whole, or by its parts. This was achieved by comparing estimated task duration for a single task, with the aggregated durations of the subtasks constituting the single task. Estimated time for a single task was significantly smaller than the aggregated time of the individual subtasks, bearing proof of the effectiveness of unpacking as a debiasing technique.

Construal-level affects future predictions

High level construals might contribute to several biases known to produce the planning fallacy. The very act of future thinking necessary for predicting future task durations, may influence on the accuracy of the prediction. Trope and Liberman (2000) has shown that people represent future events more abstractly and prototypical than they do represent the proximal future, even if the amount of information pertaining to the task is held constant. Trope and Liberman therefore contends that this association is overgeneralized, making people inclined to use high-level

construals when thinking of distal objects, and low-level construals when thinking of proximal objects, regardless of available information.

When people plan for future events, they tend to overlook constraints and possible obstacles, reflecting a "less concerned" high level mindset. Liberman and Trope (1998) showed that the value associated with a high level construal is enhanced over time while the opposite is true for a low level construal. In goal directed activities desirability of the goals state maps onto high-level construals, whereas feasibility of reaching this end state represents low-level construals. Liberman and Trope showed that decisions regarding future activities were to a higher degree influenced by the desirability of the end state, while proximal activities were concerned the about feasibility. Participants prioritized interesting assignments in the distant future condition, whereas in the proximal future condition they placed more weight on the difficulty of the task. Therefore, distant future plans were related to the desirability of activities, rather than to time constrains and obstacles.

Conceptualizing a task in a high level construal will make people more inclined to infer that the results are a consequence of their own abilities, as opposed to contextual factors. Since high-level construals represent represents the gist and central meaning of the task, hypothetical tasks should motivate for unrealistic optimism, as compared to concrete, real tasks. When it comes to predictions of performance, Armor and Sackett (2006) argued that when the task was presented hypothetically, the results revealed overestimation of how well participants would perform, displaying less correlation between real and predicted performance. In short, they were overly optimistic compared to the accuracy obtained when predicting a real task (presented as actually doing the task later on). Armor and Sackett found that people predicted to solve more questions than they did on a GRE test when it was presented as hypothetical rather than real. The participants saw the test as more meaningful and remembered fewer particular details about it. When listing factors that possibly could influence their performance, they tended to mention fewer and more stable ones. Participants also judged the test to be more indicative of their own abilities. In sum, the evidence suggests peoples conceptualization of the task to be based on a more prototypical high-level representations.

The very act of planning for a distant future creates a simplified, abstract mental object, more concerned about the essential qualities of the task than of its underlying constituents. To the contrary, as one gets closer to an object, the perception of it becomes more fine grained, and therefore more exposed to contextual factors. Peetz, Buehler, & Wilson (2010) investigated how temporal proximity affected optimism on predictions of task completion. Temporal proximity increased attention towards either; step-by-step plans, or potential obstacles in the environment. Interestingly, the situation specific differences produced an opposite effect on predictions. The tasks

(e.g., Christmas shopping, school assignment, writing task) were either presented as hypothetical or real. In the near future, real tasks elicited a focus on obstacles. This is according to Peetz et al. due to peoples enhanced awareness of potential other real life obstacles that might interfere, producing less optimistic predictions. To the contrary, a hypothetical task generated a more optimistic prediction in the near future condition, because they led people to focus on their plans. Thus, an increased focus on plans led to earlier predictions for close than distant projects, whereas an increased focus on obstacles led to later predictions, for close than for distant projects. This shows that temporal proximity can lead people to become vulnerable to contextual factors in the environment. A high-level mindset did not respond to the details in the situation to the same extent as a low-level mindset, but were instead more attentive towards the overall objective.

Past research on affective forecasting

Affective forecasting

There is a great tendency for people to overestimate the impact and duration, of both positive and negative emotions, when predicting the influence they will exert in the future, compared to the present (Wilson & Gilbert, 2003). Most people are wrong about how they feel about the future, by thinking that their current feelings will prevail and matter more, than what they end up doing. The impact bias refers to the discrepancy between the predicted emotional reaction to an event, and the actual emotional impact of that event. The impact bias covers both the intensity and the duration of the emotional reaction, whereas durability bias only addresses duration. Humans have a remarkable ability to adjust and adapt to almost any emotional situation, but fail to acknowledge this fact.

A wealth of explanations have been suggested for people's mispredictions of future emotional states, whereof immune neglect – not taking your emotional coping strategies into consideration when experiencing negative upheaval (Hoerger, 2012) and focalism – overestimating the importance of dominant aspects of a situation, forgetting to take other important nuances into consideration (Wilson et al., 2000), are cited among the most frequent. Time contraction could also provide an alternative explanation for the observed inaccuracies in affective forecasting, and will serve as an interesting new perspective to an already immense area within social cognition.

Immune neglect

A well-known cause for the durability bias is the failure to take into account how much one's emotional immune system will alleviate the negative impact of distressing events. When a painful event occurs, reconstruing the event in various ways, and such making it appear less painful is a

viable strategy. Since the psychological immune system operates outside of consciousness, the improvement of negative reactions will not be taken into consideration, when people predict their emotional responses. As a consequence, peoples subconscious coping strategies for handling negative reactions, and thereby lessening their emotional impact, will fail to be taken into account (Hoerger, 2012).

People continually make inaccurate forecasts because they fail to take into consideration their ability to adopt, cope and overcome negative emotions. People have a remarkable capacity for rationalization. Before you have been struck by misfortune, it is difficult to imagine how you manage to trivialize the importance of it. Hoerger, Quirk, Lucas, & Carr (2009) found that American footballers overestimated their reactions to wins and losses. Footballers reporting greater use of emotional processing coping strategies recovered more effectively from losses, but failed to see this when making predictions of future emotional states. Rationalization helps people find ways to see the event as both accurate and pleasant. Since almost anything can be seen in multiple ways, from a good view to a bad view, coping processes helps people find and settle on the most positive approach to the misfortunate event.

Moreover, Hoerger (2012) also investigated peoples tendency to disregard coping strategies when they were predicting distressful life events. The participants were instructed to supply predicted, and actual emotional reactions to Valentine's Day, considered to be a stressful life event. On the actual day, the participants responded to an open-ended question asking them to describe the events that had occurred. The results revealed a discrepancy between predicted and actual emotional ratings. The participants had overpredicted how positive they would feel, indicating the presence of immune neglect. Moreover, Hoerger also looked at the correlation between coping strategies and participants predicted, and actual emotional reactions. In line with the immune neglect hypothesis, coping was more highly correlated with actual emotional reactions than predicted emotional reactions. This is points towards the fact that most people do not realize the impact that coping strategies can have on their feelings, following an emotionally evocative event.

Since the psychological immune system works to alleviate negative but not positive affect, immune neglect only explains mispredictions about the duration of negative events. Since there is a tendency to overestimate positive emotional reactions as well, other mechanisms must also play a role in causing the impact bias.

Focalism

Another cause for the impact bias is people's tendency to focus too much on the event at hand, thereby failing to see the consequences of other probable events. People tend to see the focal

event in a vacuum, failing to see that their lives are filled with a lot of different activities (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2006).

People's beliefs about how they will feel in response to future emotional events, often neglect similar emotional episodes from the past. Even when people have repeated experiences with resembling emotions, they reveal limited learning from past emotional reactions. People overweight the focal emotions, and underweight the non-focal, but nevertheless relevant emotions. Wilson, et al. (2000) asked college football fans how long a football game would influence their happiness. Before the game, some of the participants were in addition given a prospective diary questionnaire, on which they rated how much time they would spend on a variety of daily activities, in the days after the football game. As predicted, people in the diary condition reported the to be less influenced by the outcome of the game, as well as thinking less about it. By asking people to consider the occurrence of non-focal events, the durability bias was reduced. This was achieved by guiding people's attention towards the realistic details of the future event, and away from the prototypes. One could speculate that the focus on certain aspects, while not taking other relevant events into consideration, can be further enhanced by an abstract mindset. Thus, construal-level might constitute a significant source for mispredictions in affective forecasting.

Construal-level and focalism

An abstract high level mindset conceptualizes events more abstractly and general, than a low level mindset. As a consequence, the lack of concrete details leads forecasters to rely on more prototypical representations. People have a tendency of underweighting the situational aspects of close events, and overweight the prototypical aspects of distal events. By not taking the situational factors sufficiently into consideration, this can easily lead to prediction biases (Kahneman et al., 2006; Wesp, Sandry, Prisco, & Sarte, 2009; Wilson et al., 2003). These biases could in addition be intensified by temporal distance, since high level construals direct focus towards the essential and schematic features of the event, and away from the contextual details.

When forecasters imagine how their lives will be in the upcoming days, they will think of current activities they are preoccupied with. However, when thinking about how their lives will be in a year from now, activities easily withdraws to the background, becoming less significant. As a result, their lives seems to takes place in an uninterrupted vacuum. In support for this claim, Liberman, Sagristano, & Trope (2002) asked people to imagine what a day in the near future would be like, they tended to describe both positive and negative events. On the contrary, when describing what a day into the distant future would be like, they were represented as more uniform and schematic, in either positive or negative terms. Furthermore, they also revealed that preferences for

events and activities that were expected in the distant future, were organized around simpler structures than preferences for the same events in the near future. In sum, this can turn out to be problematic, since the simpler and coherent representation could lack important information, crucial for the affective forecaster to rely on when making accurate future predictions.

Concrete construals will not be subject to the same problems as mentioned above, on the contrary, they could counteract focalism. A low-level mindset will be preoccupied with variety and incidental specific details pertaining to the situation. Wesp et al. (2009) examined the influence of thinking either concretely or abstractly on ratings of anticipated enjoyment of a positive future activity. In the first study participants were primed by a low level construal, whereas in the second they were given details of the events. Consistent with the hypothesis, participants primed to adopt a low-level construal rated anticipated enjoyment to be lower on the upcoming activity, since they more readily examined the details, and were less concerned about the overall gist of the positive event. In the second study, evidence showed that also explicit consideration for details influenced ratings similarly to the construal level priming used in the first study. These findings emphasize low-level construals, and details as a debiasing techniques against future optimism.

Construal-level and emotional states

Spatial distance is inextricably linked to affective states. Embedded deep within our human biology distance equals safety. Campbell (1960) suggested that visions itself was an adaptation, enabling us with safer exploration of the environment at a safe distance, by removing the need for close contact with potential dangers. For the infants survival, it is also crucial to keep close to the caregiver for food and protection. It is therefore a common assumption among people that the psychological distance to the emotional object or situation will influence its impact. A temporal distant perspective will diminish the strength of the emotion, making the impact less potent in comparison to the proximal future.

Moreover, when people distance themselves from an event, they are more inclined to reflect on the episode rather than ruminating, enhancing the capacity to recover. Recent research by Ayduk and Kross (2010) supports this notion. Participants were instructed to reflect upon a previous episode they felt rejected. When the individuals contemplated upon the episode from the perspective of someone else, experiencing a sense of distance, they recovered more effectively. Distance from the episode lead participants to reconstruct instead of reliving the experience, and made them less inclined to experience negative emotions or intrusive memories while contemplating. Therefore, if individuals adopts a high level mindset through the perspective of a mediator, reflection predominates and coping improves. On the other hand, if individuals feel

immersed in the event as they remember it, rumination predominates and coping is inhibited.

Abstract construals has also been shown to inhibit anger. Ray, Wilhelm, & Gross (2008) contrasted rumination and reappraisal by having participants to either ruminate or reappraise recent autobiographical events that elicited anger. The participant identified an unresolved event from the last two weeks in which he/she had become very angry with another person. The participant then rated how unresolved the event was, and the amount of anger felt. Subsequently the participants were instructed to write about the anger provoking conflict. The results revealed that despite spending equal amounts of time thinking about the events, participants who ruminated about it felt angrier when they recalled the event. Furthermore, they had a high probability of continuing to think about the event, and feel angry, even when they were told they could stop. This is presumably because writing the story from a first person perspective (rumination), made participants relive the emotional episode, whereas writing the story from a third person perspective (reappraisal), made the participants see through the eyes of an observer. When individuals considered an event from the perspective of a mediator, they adopted a high-level mindset, and were less likely to experience anger. The evidence suggests that distance has a soothing effect on how people perceive their negative emotions.

Present research

The main agenda of the present study is to investigate how temporal distance affects predictions of duration. To be able to achieve this goal, construal level theory was utilized as a unifying framework for investigating people's predictions of durations, in relation to such diverse predictions as performance time and affective reactions. Evidence were collected during three experiments spanning across two time condition manipulations; predicting duration estimates either tomorrow, or in the distant future a year from now.

To what extent temporal distance influence participants predictions of time estimates, was tested. The first experiment investigates the effect of the temporal distance on task duration estimates in an anchoring paradigm. This was achieved by asking participants to estimate task durations that was either to be performed in the proximal future or the distant future. The main objective of the second experiment was to test out a logical consequence of time contraction. Specifically, two task duration estimates should be perceived as more similar in the distant future, than in the present. In addition, we sought to gain evidence to what extent people tolerated delays in the near compared to the distant future, by investigating if estimates of tolerance for delays would increase as a function of time. The third experiment investigated how construal level would impact the duration of emotionally negative events. By manipulating temporal distance, the reported

intensity of emotions as well as their duration, was measured in both proximal and distant future.

Experiment 1: The effect of temporal distance on task duration estimates in an anchoring paradigm

The first experiment is a replication of Kanten's (2011) design within an anchoring paradigm, thus a short description of anchoring research will first be presented before the actual experiment. Furthermore, Mussweiler (2003) theory of selective accessibility, will have implications in relation to anchoring – for both predictions and interpretations of the results, and will therefore be mentioned briefly.

Anchoring

People's tendency to rely heavily on the first piece of information offered when making decisions is referred to as anchoring. Once the initial anchor attribute is established, it will influence the subsequent judgements and guide the final answer in the direction of the anchor. Tversky and Kahneman (1974) investigated the assimilation of estimates towards a previously given standard. This was achieved by spinning a wheel of fortune in the presence of the participants, and letting the wheel stop at either ten or sixty five. Subsequently, the participants were to decide if the percentage of African Nations in the United Nations, were lower or higher than the anchor value. The participants who had watched the wheel stop at ten, estimated in average lower values (25%), than participants who had watched the wheel stop at sixty five (45%). The comparison with the standard had raised the estimates in the low-anchor condition, and lowered them in the high-anchor condition.

The anchoring effect has proved to be a ubiquitous and robust psychological phenomena, difficult to account for when making judgements, even when judges intentionally tries to avoid being influenced by the anchor attributes (Wilson, Houston, Etling, & Brekke, 1996) or have expertise in the domain in question (Wright, 1989). In particular, it has been observed in a broad array of different judgmental domains, such as general knowledge questions (e.g., Tversky & Kahneman, 1974), estimates of self efficacy (Switzer & Sniezek, 1991), evaluations of lotteries and gambles (e.g., Chapman & Johnson, 1994), and probability assessment (e.g., Tversky & Kahneman, 1974), and estimating duration estimates (Thomas, Handley, & Newstead, 2007; Thomas & Handley, 2008).

Assimilation

Three different mechanisms have been described that may contribute to assimilation

anchoring; insufficient adjustment from a starting point (Tversky & Kahneman, 1974), conversational inferences, and numeric priming (Strack & Mussweiler, 1997).

In numeric priming directing attention to the anchor value increases its accessibility, so that it comes to mind easily when the final estimate is produced. As a result, it will lead to assimilation, including the value in the final judgement. This variant of priming focuses exclusively on the numeric component of the anchor value, while the semantic context in which the value is presented is ignored. However, this implies that the anchor value should remain uninfluenced by contextual changes. Wilson et al. (1996) tested this assumption by changing judgmental dimension, such that the comparison was to another entity, other than the one previously used. In the relevant condition, people were asked to judge whether their number was less than, equal to, or greater than the number of countries in the United Nations. In the irrelevant condition, people were asked to judge whether their number was less than, equal to, or greater than an unrelated question; how many physicians and surgeons there were in the local phone book. The estimates for the number of African nations in the UN were influenced more strongly by an anchor compared to the same entity (the number of African nations in the UN), than to another entity (the number of local physicians in the phone book). A change of basis for comparison decreased the accessibility. Numeric anchoring fails to explain these results. To remedy for this deficiency Strack and Mussweiler proposed the selective accessibility model.

Selective accessibility model

Mussweiler and Strack (1999) claims anchoring is a form of semantic priming. As previously mentioned, numeric information is activated by the anchor to be included in a comparative anchoring task, it will subsequently be more accessible. A link between the anchor value to the target object has to be established, enabling the generation of semantic knowledge about the target object. When evaluating a new hypothesis, the individual looks for attributes similar to the anchor, producing the anchoring effect. For instance, Wilson et al. (1996) instructed participants take part in a comparative anchor task, indicating whether the target object were larger or smaller than the anchor value (e.g., the river Elbe is longer than 890 km, or shorter than 590 km). Subsequently they were asked to indicate the length of the river Elbe. The result revealed that the absolute estimates were higher in the high anchor condition, than in the low anchor condition. According to Mussweiler and Strack, in a standard comparative task people are first testing for the possibility that the target is equal to the anchor value. Judges selectively generate semantic knowledge that is consistent with the notion that the target's value is equal to the anchor value. Mussweiler and Strack further contended to solve the subsequent absolute task, participants

appeared to resort to semantic knowledge that has been rendered easily accessible when solving the comparative task. Because this evidence was selectively generated to be anchor consistent, its use leads to absolute estimates that are anchor-consistent as well. Thus, anchoring effects appear to be mediated by the joint influence of hypothesis-consistent testing and semantic priming. The process of hypothesis consistent testing assumes the person perceives the anchor to be plausible so it is not immediately discarded, before the hypothesis testing takes place.

The first experiment investigated whether temporal distance increase the probability for assimilation of anchor values, compared to low level construals. This was achieved by asking participants to estimate the duration of tasks that was either to be performed in the near future, or one year from now. In addition, the questionnaire included high or low numeric values serving as anchors, reporting what previously had been estimated by another person on the identical task.

The fundamental differences between high-level and low-level construals has implications for how people represent and compare stimuli when making judgements. When perceiving two stimuli in relation to each other, the stimuli can either be assimilated, thereby seen as more similar and closer to each other, or the stimuli can be contrasted, thereby viewed as more dissimilar and separate from each other. Since assimilation and contrasting represents converse effects, an essential question will therefore be what causes the one or the other.

High-level construals has been shown to increase the possibility for assimilation in social comparisons, while low-level construals enhances the chances for contrasting. Förster et al., (2008) study 1, found a significant moderation of construal-level, on the effect the priming had on person perception. Those primed to adopt a high-level mindset, intensified assimilation to the prime, whereas a low-level mindset produced contrast. It has also been shown that construal-level not only moderates person perception, but also influences self-evaluations. Förster et al., study 4 revealed that the distant future condition produced increased self-ratings when comparing to a high standard, and decreased self ratings when comparing to a low standard. A possible explanation is that assimilation to the prime had occurred to a greater extent because of the high-level mindset.

According to Mussweiler and Strack (2011); Mussweiler (2003), when exposed to numeric anchoring, the participant starts evaluating the plausibility of the anchor by initiating similarity search. Similarity testing selectively makes accessible knowledge, indicating target-standard similarity, whereas dissimilarity testing selectively makes accessible knowledge, indicating target-standard dissimilarity. Thus, during similarity search retrieval of subjective knowledge from memory consistent with the numeric value occur. In turn, this strongly influences the construction of knowledge serving as the basis for the estimate of the task duration. As a consequence, similarity

testing typically leads to assimilation of the numeric value. Moreover, Mussweiler (2002) revealed that people who were induced to focus on similarities, rather than differences during a series of anchoring tasks, revealed a more pronounced anchoring assimilation effect. Listing similarities in the priming task seems to have facilitated the similarity test, whereas listing differences appears to have impeded similarity testing.

Induction of a greater perspective, will make participants more attentive to the primary features of situations, actions and objects (Trope & Liberman, 2000). One possible implication of being attentive towards essential features is a heightening of sensitivity towards the anchor value, leading to an increased susceptibility for anchoring effects. When induced with a high-level mindset, the numeric value can affect hypothesis search, making the participants remember estimates in line with the anchor during knowledge acquisition. If high-level construals should prove to enhance similarity search, the assimilation of the anchor attributes could occur to a greater extent, and subsequently impacting the final decision more heavily. A possibility is therefore, when participants are induced into a high level mindset similarity testing and assimilation of the anchor will occur to a greater extent, as opposed to a low level mindset, were contrasting the value would happen more easily. In short, since a high level mindset may enhance assimilation (Förster et al., 2008), the anchor will more readily influence the judgmental process. According to Mussweiler (2003), this is due to searching for knowledge consistent with the numeric value. As a result, the value will influence the estimates of task duration to a greater extent in the direction of the anchor.

The present experimental design utilizes both time and anchor as variables. However, we could also obtain a main effect of time, without any anchor interaction, leading to an increase of task duration estimates. The effect of temporal distance has been observed numerous times in construal-level paradigms (Hansen & Trope, 2012; Kanten, 2011), and should be an expected as highly probable in the current research as well. Therefore, we hypothesize that as time shrinks as a function of temporal distance, the same amount of time units will not suffice to cover the objectively same task across distance conditions (Kanten, 2011). Since the object like quality of the task will decrease at a slower pace than the malleable character of time; time contraction will produce an increase of task duration estimates when moving from the present to the future.

Furthermore, a highly probable outcome for the present experiment is to obtain a main effect of anchoring, without any interaction of time. As previously noted, the anchoring effect has been obtained in numerous differential judgmental domains (e.g., Mussweiler & Strack, 1999, 2011), and should be expected to make its mark on the preset study. If this proves to be the case, the estimates will get assimilated towards the anchor value, resulting in an observed increase of task duration estimates across anchor conditions, when the anchors are high rather than low. The last hypothesis

states that the high-anchor condition will raise the estimates in the direction of the anchor, whereas the low-anchor conditions will decrease the estimates, in the direction of the anchor.

Method

Participants

Participants were 243 undergraduate students attending various lectures at the University of Oslo, 84 men and 158 women, whereas 1 did not indicate sex; mean age = 23.9 years. They were randomly distributed to six groups, each group receiving a specific version of the questionnaire described in more detail below.

Materials and procedure

Each participant was asked to estimate the time they needed to complete three tasks different tasks; To write a summary of a chapter, to proofread an article, and to transcribe fifty pages from a diary. Participants were assigned to either a *near future* condition; imagining doing the task tomorrow, or a *distant future* condition; imagining performing the task in 1 year. Additionally, the participants were placed in either one of two anchor conditions, describing a high numeric value (high anchor), or a low numeric value (low anchor), in addition to a control condition without anchor. The high/low anchor values were set to 17/5 hours in the first task, 12/4 hours in the second task, and 30/10 hours int the third task respectively. The anchor values were collected from estimated minimum (near future) and maximum (distant future) task durations, serving as plausible, but relative extreme anchors (Kanten, 2011; study 1, study 5). This concluded a 2 x 3 design with temporal distance (near vs. distant future) as the first independent variable, and anchoring (low vs. high anchor vs. control) as the second independent variable.

An English translation of the questionnaire is presented below. Temporal distance manipulation is written in parentheses in the text, while the anchoring condition is marked by brackets. In the control condition, information relating to the anchor was omitted altogether (See appendix A for all three task descriptions).

> *Task 1: Summary*. Imagine that you (tomorrow/some time next year) are hired as a research assistant for Professor Olsen. Your first task is to write a summary of a chapter in a new book about the Second World War. You are not familiar with the book and the chapter is 30 pages long. The summary is required to be 5 pages long with font size 12 and with line spacing of 1.5. Assume that you have nothing else to do while working on the summary. You start working on the task (tomorrow/22 January 2013). A former

research assistant spent [17/5] hours on another summary of the same magnitude. Will you need more or less time than the assistant to complete the task you start on (tomorrow/22 January 2013)?

After reading through the description of the exercises the participants were asked to indicate the amount of time they would use by checking one of the following options (less, more, approximately the same). Next, the participants estimated the number of working hours they most likely would use on the job. Then, they indicated how confident they were in their estimate from (from 0 to 100%), and how difficult the task were perceived to be (1: very difficult, 7: very easy). Lastly, they were asked to rate the perceived scope of the job from (1: very small, 7: very large). Questionnaires belonging to the 6 different conditions were randomly distributed to the students attending several lectures during their break, between the first and the second part of the lecture. Responding to the questionnaire took approximately 5 minutes and was on a voluntarily basis, accordingly the participants were not given any monetary incentive.

Results and discussion

Task durations were positively skewed and were therefore log transformed. Scores from the three different tasks were converted into z scores and aggregated to form a single index of the duration estimates ($\alpha = 0.79$). In cases where participants had checked the "approximately the same" option, while failing to fill in the duration estimate, the anchor value was used as the estimate. A 2 x 3 design with temporal distance (near vs. distant future), and anchor (low vs. high anchor vs. control) between subjects ANOVA revealed a significant main effect of anchoring condition $F(2, 235) = 72.79$, $p < 0.0001$. Pairwise post hoc comparisons (Tukey) revealed that estimates in the low anchor condition ($M = -0.55$, $SD = 0.70$) was lower than in the control condition ($M = -0.24$, $SD = 0.93$), $p < 0.031$, whereas estimates in the high anchor condition ($M = 0.89$, $SD = 0.74$) was higher than in the control condition ($M = -0.24$, $SD = 0.93$), $p < 0.0001$.

Furthermore, there was also a main effect of temporal distance, $F(1, 235) = 17.45$, $p < 0.0001$, indicating that people suggested higher estimates on distant future tasks ($M = 0.19$, $SD = 1.01$) than on near future tasks ($M = -0.21$, $SD = 0.95$). The interaction between time and anchor was not significant ($p = 0.19$). The back transformed mean log scores for each task in the near versus distant future condition are 2.53 versus 2.77 h for the chapter summary task, 1.92 versus 2.23 h for the proofreading task and 3.03 versus 3.25 h for the text transcription task (see figure 1). Accordingly, imagining the tasks one year ahead made the estimates 9% longer, accumulated across all three tasks (see table 1).

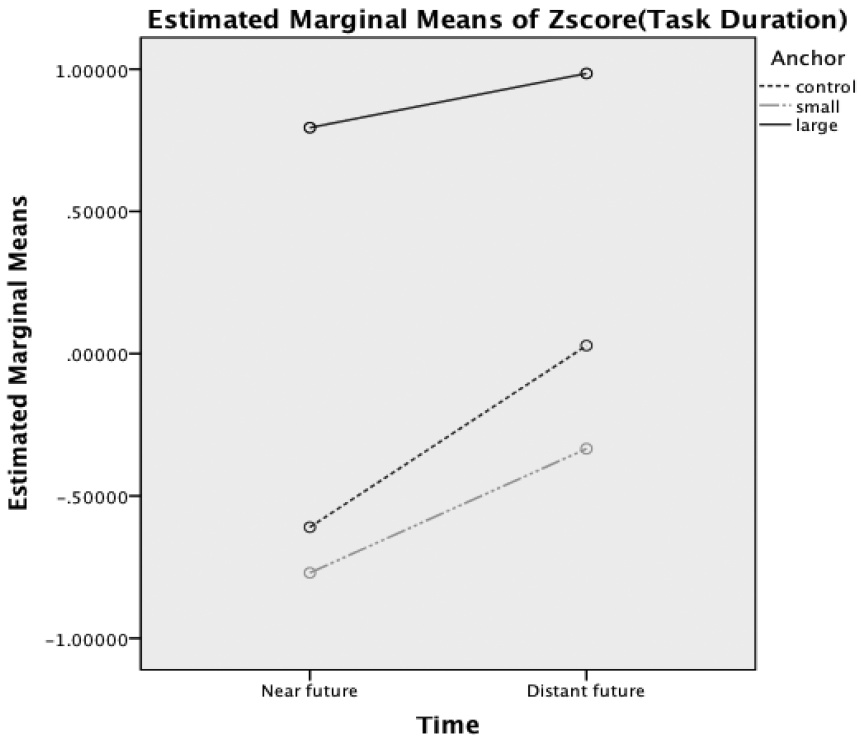

Figure 1. Mean task duration estimates for the 3 anchor conditions in the near and distant future.

Table 1
Estimated task duration estimates as a function of temporal distance in three conditions (mean log transformed number of hours; standard deviations in parentheses), Experiment 1.

Task	Near future	Distant future	F	*p*
Writing summary				
Control	0.89 (0.22)	1.02 (0.27)	6.15	0.015
Small anchor	0.77 (0.13)	0.88 (0.23)	6.61	0.012
Large anchor	1.15 (0.20)	1.20 (0.28)	0.77	0.38
Proofreading				
Control	0.55 (0.23)	0.78 (0.34)	12.66	0.001
Small anchor	0.53 (0.20)	0.67 (0.18)	9.69	0.003
Large anchor	0.92 (0.23)	0.97 (0.27)	0.90	0.35
Transcribing text				
Control	0.96 (0.25)	1.08 (0.34)	3.59	0.061
Small anchor	1.00 (0.23)	1.07 (0.34)	1.20	0.28
Large anchor	1.41 (0.22)	1.44 (0.17)	0.56	0.46

Next, aggregated rating of confidence were examined. A 2 x 3 design with temporal distance (near vs. distant future), and anchor (low vs. high anchor vs. control) between subjects ANOVA provided a main effect of anchor condition $F(2, 228) = 4.11$, $p = 0.018$, but no main effect of time $F(1, 228) = 0.67$, $p = 0.42$. Pairwise post hoc comparisons (Tukey) showed that confidence in the high anchor condition ($M = 58.56$, $SD = 18.89$), were lower than in the control condition ($M = 64.10$, $SD = 15.77$), $p = 0.10$, whereas confidence in the low anchor condition ($M = 66.43$, $SD = 17.18$) was higher than in the control condition ($M = 64.10$, $SD = 15.77$), $p = 0.66$. The analysis also revealed a marginally significant interaction effect between time and anchor $F(2, 228) = 2.91$, $p = 0.056$. Pairwise post hoc comparisons (Tukey) examination of the anchors in the proximal future condition revealed significant differences $F(2, 108) = 6.50$, $p = 0.002$. Confidence was rated lower in the high anchor condition ($M = 55.73$, $SD = 20.63$), than in the control condition ($M = 65.90$, $SD = 16.18$), $p = 0{,}038$, whereas confidence was rated higher in the low anchor condition ($M = 70.37$, $SD = 15.95$), than in the control condition ($M = 65.90$, $SD = 16.18$), $p = 0{,}52$. On the contrary, when the task were in the distant future condition, confidence was unaffected by the anchor manipulation, revealing no significant differences between them $F(2, 120) = 0.08$, $p = 0.93$ (see figure 2). Response scales of scope and difficulty of the task, revealed no significance between conditions.

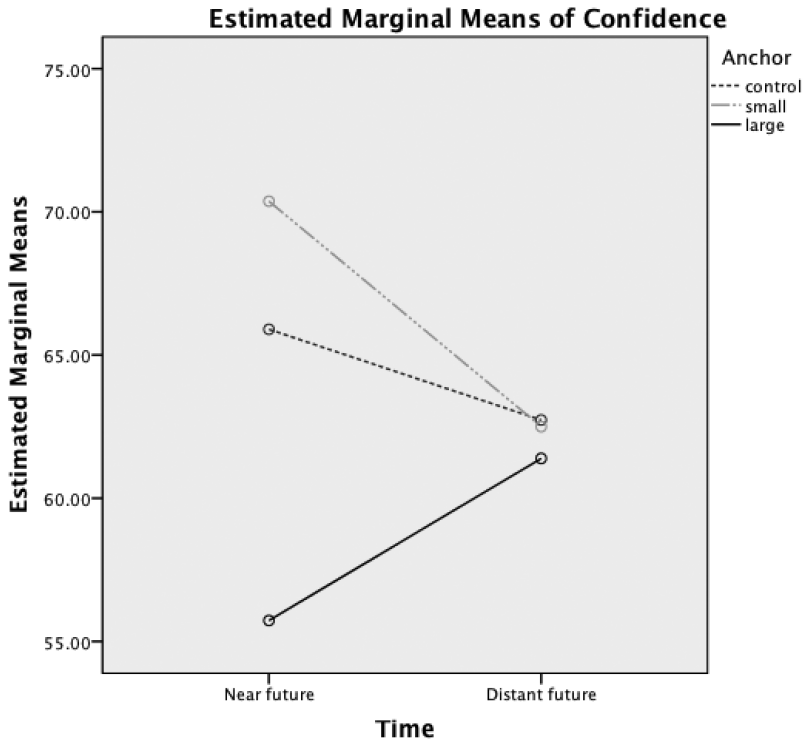

Figure 2. Mean confidence score for the 3 anchor conditions in the 2 temporal distance conditions.

The results from the first experiment revealed a significant main effect of anchoring, and a significant main effect of time. However, contrary to the first prediction, there was no significant interaction between time and anchor condition, pointing towards two distinct psychological phenomena. These data provide useful knowledge since estimation of distant future task duration will not need to take extra precautions to the reciprocal influence of construal level on anchoring, thus avoiding the possibility for even larger bias. Nevertheless, the evidence supports coexistence of these two distinct phenomena within the same experimental paradigm, highlighting the vigorousness of both effects. The obtained main effects produced by anchoring and temporal distance, provides useful evidence of their influence when estimating task durations.

As hypothesized, the high anchor condition provided significantly higher estimates than the control condition, while the low anchor produced significantly lower estimates than the control condition, both in the near and distant future. This is unsurprising, since the anchoring phenomena is extremely robust, and has consistently produced effects in a diverse range of enquiries since its introduction (Tversky & Kahneman, 1974).

As predicted, participants in the distant future condition provided higher estimates than those in the near future condition. This must be taken into consideration when planning for future tasks. At least in distant future scenarios, this could possibly reduce the observed underestimation of task duration on simpler tasks. At the same time, the effects of construal level may diminish or perish altogether when the tasks in question are more complex. Specifically, tasks that require elaborate and detailed planning, may induce a concrete mindset that could override the effect of time perspective.

We also asked the participants about their confidence level in the estimated task durations. The results revealed an effect of the anchoring condition on the confidence ratings $p = 0.017$, as well as a marginally significance between the time x anchor interaction $p = 0.056$. Interestingly, all anchors converge towards a common point in the distant future condition, independently of anchor size or control, as if time effectively eliminates both extreme confidence and lack of confidence. Why participants in the low anchor condition should lose confidence in their estimates from the near future to the distant future, while participants the high anchor condition gains confidence when traveling towards the future, is hard to explain. The result suggest more confidence in high estimates in the distant future, and more confidence in estimates in the present. However, the low anchor condition showed higher confidence values irrespective of time ($M = 66.43$, $SD = 17.18$), in comparison to the high anchor condition ($M = 58.56$, $SD = 18.89$), possibly pointing to the uncertainty produced by the extremeness of the high anchor.

In line with previous research we found that the increase of task duration estimates over

temporal distance could be explained by introducing a time contraction mechanism. Induced into a high level mindset by a distant future scenario, the time units used to measure the task duration subjectively shrinks. Since the object like quality of the task shrinks at a slower pace, than the malleable character of time, more time units are needed in covering the objectively same task, from proximal to distant future (Kanten, 2011).

Another possibility is that it is the perception of the task rather than time itself that changes with distance. Past research has shown that a low-level mindset is better suited for being attentive towards details and idiosyncrasies. Consequently, people in a low level mindset will more likely unpack a task into its individual components, since it is better at identifying different subtasks. Kruger & Evans (2004) showed that unpacking of tasks would lead to higher estimates, due to the perceived enlargement of the task itself. However, the current findings revealed that people in a high level mindset produced higher estimates. A possible explanation to this contradiction is that the current task is typically not unpacked by the participants, but is instead perceived schematic and coherently.

Inbar, Cone, & Gilovich (2010) found that people are cued by the features of a task to follow intuition or reason when making a choice. Complex choices elicit a preference of choosing rationally, as well as the opposite; choosing rationally is typically preferred for complex choices. Thus, every task possesses an automatic cognitive fit, such that the task elicits the most appropriate mindset, as much as the other way around. The nature of the task has to maintain a form of complexity and natural segmentation for the low-level mindset to map onto. Since complex tasks will be detrimental or eliminate the high-level mindset altogether, it seems like the tasks used in the first experiment, presumably provided good grounds for abstract thinking. This is supported by the main effect of time.

Whether two task duration estimates will be perceived as more similar across temporal distance, as a consequence of time contraction is the main agenda of investigation in the second experiment. As a consequence of the contraction of time when moving up in construal level, both the task duration estimates as well as the deviation between them, will be perceived to bear greater similarity. The judged correctness between estimates may therefore be influenced by the effect of time shrinking.

Moreover, even though it seems that the current tasks are well suited for measuring the effect of temporal distance on time perception, the experimental paradigm cannot exclude the perceived enlargement of task as a confounding factor. The second experiment eliminated task altogether, thereby making time the sole factor. In the second experiment we therefore strive to collect more evidence for the possibility of time contraction as the mediating force between

temporal distance and estimated duration. This was achieved by investigating whether perception of time was modified, by asking participants to estimate the smallest delay they would consider being significant for a set of different situations.

Experiment 2: Deviations and delays

Time contraction contends that two task duration estimates will look more similar in the distant future, as opposed to the present. The second experiment tested the validity of this claim by asking participants to rate the similarity (dissimilarity) between two task duration estimates on a response claim. Moreover, the effect of time contraction further explored, by investigating to what extent participants tolerated delays in the near compared to the distant future. This was accomplished by asking participants to estimate the minimum delay they considered being a significant delay.

The main objective of the second experiment was to test out whether the perceived similarity between task durations increase as a function of distance. When predicting the duration of a future task it will preserve its constitution to a greater extent, compared to the time horizon embracing the task. Therefore, the contraction or expansion of time in relation to the task cannot be perceived in an absolute sense. Instead, it is a relative process; time shrinks at a quicker pace as function of distance and construal-level, compared to tasks (Kanten, 2011). The shrinkage of time will have implication for how we perceive two task duration estimates projected into the distant future. As a consequence of the contraction of time when moving up in construal level, both the task duration estimates as well as the deviation between them, will be perceived to have greater similarity. This effect may influence the judged correctness between estimates. Kanten (2011) noted that if you predict you can do a job in two hours, and I predict it will take three, do we agree or disagree? This question is highly dependent upon perspective, since a low level mindset will find the difference to be large; the estimate is in fact 50% dissimilar. On the other hand, the high level mindset sees the situation from afar, across the psychological distance of a year from now. From that position the difference between two and three hours seems miniscule, and hence similar in the midst of the ocean of time. Therefore, we hypothesize that a high level mindset will judge duration estimates to bear greater similarity, while a low level mindset will perceive the estimates to be more dissimilar.

The previous experiment revealed an increase of task duration estimates from near to distant future. This observation could simply be the result of the perceived enlargement of the task itself, requiring more time for completion, and not the shrinkage of the actual time unit (Kanten, 2011; study 4). However, if participants were to accept larger delays in the distant future compared to the

near future, it is possible that the increasing delay estimates is related to time, and not a property associated to the task. Both estimations of task duration, as well as estimations of significant delays are predictions concerned with revealing a temporal length interval, thus duration is the common denominator. The first prediction is therefore a continuation of the first hypothesis. Psychological distance should produce greater estimates for temporal durations in general, and in our particular case for delays. When an unexpected delay occurs, greater acceptance for the delay should be anticipated when imagined a year into the future, as opposed to tomorrow. Participants induced with temporal distance will therefore produce greater estimates when evaluating the minimum delay considered to be a significant delay.

Method

Participants

One hundred and twenty seven students attending an introductory lecture in political and educational sciences at the University of Oslo were recruited as participants (35 men and 92 women). Four participants failed to answer the delay estimates by submitting zero as their minimum significant delay, and were subsequently discarded from the sample, leaving the total number of participants to 123 (35 men and 88 women; mean age 22.9 years).

Materials and procedure

The participants were presented three distinct situations were delays had occurred. The first situation dealt with hiring renovation workers, the next buying a personal computer, and the last were related to buying textbooks for attending university courses. The participants in the near future condition were asked to imagine the delay to take place tomorrow, while the distant future condition were asked to imagine the delay to take place in one year. Next, an English translation of the renovation task is presented. The text distinguishing the two conditions appear in parentheses (See Appendix B for all task descriptions).

> *Renovation:* Imagine that you (tomorrow/sometime February 2014) decide to hire a craftsman to do renovation in your kitchen. You contact two different craftsmen. Per estimates the work to be done in 6 days. The other, Pål, says the job will take 10 working days. Both say they can start working in a few days from now.
>
> To what extent would you say that Per and Pål's estimates differ from each other (put a cross on the line)? Participants marked their response on a seven centimeter long

horizontal line. The left endpoint was labeled; estimates are very *similar*, while the right endpoint was labeled; estimates are very *dissimilar*. Participants were then presented with the following text.

It turns out that Pål cannot undertake the work, instead Per gets the job. A few days into the job a week from today, it turns out that the job proceeds more slowly than anticipated, and you have to assume that Per will be delayed beyond the estimated 6 days. What would you say is the minimum delay that should be considered significant, for the renovation work you order (tomorrow/some time next year)?

After reading through the task description, participants were asked: "What would you say is the minimum delay that should be considered significant"?

Participants received the questionnaires in the break between the first and second part of the lecture. The questionnaires were randomly distributed to persons attending the same lecture. Participants were instructed to answer the questions in the order they appeared and were not allowed to talk to each other during the approximately 5 minute long session.

Results and discussion

The participants were instructed to make a mark on a scale, indicating the perceived similarity (dissimilarity) between two task duration estimates. The distance between the start of the line and the marking were measured, and served as dependent variable. All three tasks were aggregated to form a single index of similarity judgements. Participants in the distant future condition marked for greater similarity on the scale (M = 4.14, SD = 1.13), than participants in the near future condition (M = 4.71, SD = 0.91), $F(1, 121) = 9.59$, $p = 0.002$, (see table 2).

Table 2
Similarity scores as a function of temporal distance in three conditions (7 step response scale; standard deviations in parentheses), Experiment 2.

Task	Near future	Distant future	F	*p*
Renovation workers	4.19 (1.37)	3.86 (1.50)	1.55	0.216
Buying a PC	5.03 (1.06)	4.04 (1.54)	16.93	0.000
Buying textbooks	4.92 (1.10)	4.51 (1.43)	3.23	0.075

As in experiment 1, the estimates were log transformed before they were analyzed. The log scores of all three estimates were then converted into z scores and aggregated to form a single index of duration estimates ($\alpha = 0.70$). The z score revealed higher estimates when induced with a temporal distant perspective ($M = 0.21$, $SD = 0.75$), than when induced with a temporal proximal perspective ($M = -0.23$, $SD = 0.78$), $F(1, 121) = 10.33$, $p = 0.002$ confirming the hypothesis. (See table 3 for individual log scores across conditions).

Table 3
Delay estimates as a function of temporal distance in three conditions (mean log transformed number of hours; standard deviations in parentheses), Experiment 2.

Task	Near future	Distant future	F	*p*
Renovation workers	1.05 (0.44)	1.23 (0.48)	4.34	0.039
Buying a PC	1.01 (0.61)	1.33 (0.49)	9.91	0.002
Buying textbooks	0.91 (0.51)	1.12 (0.56)	5.04	0.027

According to the time contraction idea, the delay estimates and the similarity judgments should be negatively correlated. This was indeed the case ($r = -0.30$), showing a significant correlation $p = 0.001$, confirming their covariation.

As predicted by the first hypothesis, time contraction led the participants to perceive the difference between the task duration estimates to be more similar, while proximal distance led them to believe they were more dissimilar. When time shrinks, the perceived dissimilarity between the estimates appear reduced, thus producing greater acceptance for the deviation. That is, in the present moment the deviation will loom large, and to a greater extent be judged as unacceptable, whereas projected into the future the deviation will to a higher degree be deemed as acceptable. For instance, in the present experiment when induced by temporal distance to adopt a high level mindset, the difference between e.g., 6 and 10 days, was perceived as more alike in the eye of the beholder. On the other hand, when in a low level mindset, the same deviation of 4 days was perceived to be more dissimilar. Hence, because of the contraction of time as a function of temporal distance, the participants marked for 12.10% greater similarity when in a high compared to low-level mindset.

Previous research reveals that psychological distance increases task durations (e.g., Buehler et al., 1994; Kanten, 2011). Low-level construals might lead people to engage in unpacking, which

has been shown to increase estimates (Kruger & Evans, 2004). A possible explanation for the latter results points to construal-levels alteration of the perception of the actual task. A low level-construal will contain more task details, hence an information increase in relation to the task is the driving force behind the increasing duration estimates. The present research contradicts this claim. As predicted, the experiment reveals that even delay estimates will increase as you move up in construal-level, and points towards time contraction as a plausible mechanism. This is not to claim that the task itself will not be affected by the construal-level manipulation, but time related mechanisms will in addition directly influence on the increasing duration estimates. Time contraction is possibly one of these mechanisms.

Finally, when in an abstract mindset, the negative correlation is supported by the dependency of the similarity score, and the simultaneously increasing delay estimates. Consequently, when the delay estimates increase as a function of time, the perceived distance between the task duration estimates will at the same time decrease, and therefore appear more similar. The other way around, when the deviation between the estimates are perceived to be more alike – as a consequence of time contraction, the delay estimates will simultaneously increase.

These findings bear a striking resemblance to the suggested mechanism of time contraction. Kanten's (2011) studies 1-3 suggested the observed increase in duration estimates, when moving up in construal-level, was a result of the contraction of time. When the subjective time unit shrinks as a function of moving from the present into the future, the amount of units needed to cover the task in the present, as compared to the future, will subjectively need to increase in order cover the same task. Furthermore, to directly test the perceptual change, causing the actual shrinkage of time across distance conditions, participants were instructed to measure the length of one hour (Kanten, 2011; study 4). This was accomplished by letting the participants draw the length of an hour. As suspected, the results revealed a shrinkage of time from present to future. Moreover, the observed increase of duration estimates could be caused by other sources than the contraction of time. A mediation analysis was conducted to show, that time was the mediating factor for the increase of estimates, further strengthening the assumption of time contraction as the cause Kanten (2011; study 5).

The same model used for testing the time contraction hypothesis (Kanten, 2011; study 5) was utilized in the present experiment. The mediation model seeks to identify the process that underlies the relationship between temporal distance and duration estimates, via the inclusion of the similarity score. Instead of a direct casual relationship between temporal distance and estimated duration, we suspect that the temporal distance influences the similarity score, which in turn influences the duration estimates. Therefore, the similarity score serves to clarify the nature of the

relationship between temporal distance and the duration estimates. In our case, the similarity score was considered to play an important role in governing the relationship between temporal distance and duration estimates. Thus, in the mediation analysis, we examined whether the similarity scores mediated the relationship between temporal distance and estimated delay. A bootstrap approach to mediation proposed by Preacher and Hayes (2004) was applied to the data. We conducted this analysis using a 20 000 samples to determine a confidence interval (Cl) for the indirect effect of temporal distance on estimated duration, mediated by the similarity score. The results supported this predicted relationship (95%, Cl = 0.0142, 0.2300; point estimate = 0.1036). The full model with the individual path coefficients is depicted in (see figure 3). Therefore, the introduction of temporal distance caused time to subjectively shrink, which in turn made people increase their duration estimates, when judging the minimum delay that should be considered significant.

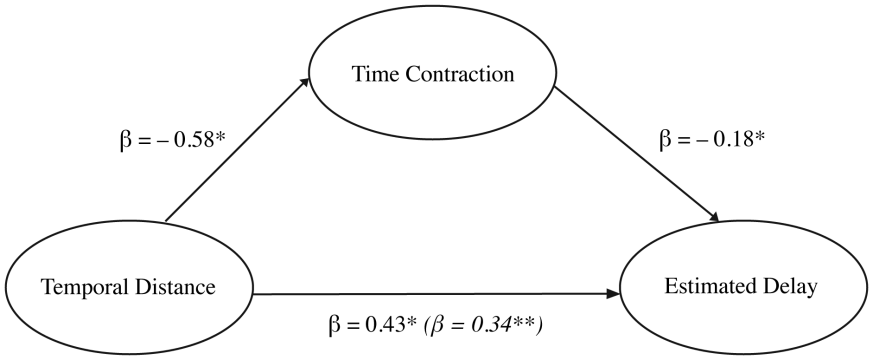

Figure 3. Time contraction mediates the effect of temporal distance on estimated duration (Experiment 3). The effect of temporal distance on estimated duration, was mediated by the perceived similarity/dissimilarity score. The coefficient in parentheses signifies when time contraction is included in the model. * $p < 0.01$. ** $p < 0.05$.

These findings replicate Kanten's (2011) study 5, with the marked difference of using delay estimates (e.g., perceived difference between 6 and 10 h) instead of estimates for the length of an hour, as the mediating factor between time and estimate duration. That is, both subjective estimates for the length of an hour, and the perceived difference between 6 and 10 h, can be treated as a generic unit of duration (e.g., time unit) regardless of factual length, and therefore equally well serve as evidence for the mechanism of time contraction. It is however important to point out that Kanten's study explicitly asked participants about their opinion of the length of an hour, and will therefore represent more reliable evidence for asserting the time contraction mechanism, than data provided by the current experiment.

However, is it possible to obtain the same results without intervention of time contraction? In correspondence with Bless and Schwarz (2010); Förster et al. (2008) assimilation and contrasting

effects could also account for the increasing duration estimates as a function of temporal distance. When a delay estimate quantified in terms of days or weeks are seen from a distant perspective of a years time, contrasting would typically occur, since the distance of a years time appears vast in comparison to relatively tiny duration estimates. As a consequence, people involuntary increase the estimates without noticing, as a compensation for the enormous difference between time unit and time horizon. A mind concerned with the "big picture" would tend to gravitate towards the sphere of the large numbers, thereby relieving the contrast between the grandeur of the surrounding time horizon, and the tiny duration estimate in question. However, this explanation has been rejected by Kanten's (2011) study 2 and 3, where a high-level mindset was achieved by priming participants with high versus low level mindsets outside the context of the estimation task. Hence, contrasting caused by a vast time horizon of a year, cannot be accountable for the increase of estimates.

In sum, the results from the previous two experiments strengthen the hypothesis that predictions of duration generally increase as a function of distance. In areas as diverse as task durations and delays, it has been shown a significant increase in predicted estimations from proximal to distant future. This evidence highlights the elasticity of time over temporal distance, independent of the nature of the task. The subjective experience of time becomes less sensitive, and decreases across temporal distance, supporting the idea of time contraction. In addition, deviations between estimates is perceived to be more similar when moving up in construal level. Furthermore, aspiring to transpose construal level into new domains, the next experiment investigates how peoples predictions of negative emotions will impact their well being.

Experiment 3: Near and distant future affective forecasting

The rationale for the study was to investigate whether temporal distance would lead to an increase in affective durations, as a consequence of time contraction. If so, this is in line with the previously obtained results on task durations, and delays. In addition, we wanted to test how construal level would impact people's perception of emotional intensity over temporal distance. We expected that temporal distance would lead to weaker emotional reactions, compared to temporal proximity. This was achieved by asking participants to rate the impact of emotional events, and for how long they thought the reaction would last before it ceased to exist, in two distinct conditions; either tomorrow or a year from now.

The duration of peoples current emotional state should be affected by temporal distance. That is, Construal-level should be expected to influence affective durations, making emotions to fade away more rapidly in the present, as a consequence of the time contraction hypothesis (Kanten, 2011). Since each time unit is perceived to cover more temporal space in the present, this implies

that the emotion will fade away more rapidly in the future. That is, since less time units are needed to cover the emotion from its initiation to its extinction in the present, this will create a shorter overall duration. Therefore, we hypothesize that the distant future condition will produce longer affective durations before the emotion ceases to exist, as opposed to the near future condition.

However, immune neglect can also provide a plausible explanation for. A common error in affective forecasting is to think the emotion will linger in you for a longer period than is the case. For emotional negative events, ignoring the inherent emotional immune system is a common error producing the durability bias. This error stems from a failing to anticipate the automatic reaction protecting, and recovering you from distressing incidents (e.g., Gilbert et al., 1998; Hoerger et al., 2009; Hoerger, 2012). By not taking the immune system into account when judging recovering periods for negative events, the duration will be predicted to last longer than what is the case.

In addition we wanted to test how temporal distance would affect emotional reactions. Seeing the emotion from a distant perspective, "could cool" down the emotional heat to a temperate level, as a result of traversing temporal distance. This idea is in accordance with Trope and Liberman (2010) of a subjective reference point. Since psychological distance is egocentric, connected to the present self, the more closely connected the emotional object is to the subjective reference point, the reaction will exert greater strength. In line with these predictions, research by Ayduk and Kross (2010) and Ray, Wilhelm, & Gross (2008) has revealed that psychological distance leads to better coping and less anger for negative emotional events. Thus, we hypothesize that the distant future condition will produce less emotional impact, than the near future condition.

However, it can also be argued that a high level mindset would perceive future emotions with more impact. When adopting a high level mindset the broader implications of the emotional impact will be taken into consideration, potentially pronouncing the effect of the unwelcome outcome. The simpler, general picture conveyed by the minds eye in the distant future scenario, will therefore create an emotionally uniform representation, potentially enhancing the emotional reaction to be more unilateral (Liberman et al., 2002; Trope & Liberman, 2010). Moreover, high-level construals could be further enhanced by focalism, by an increased attentiveness towards the focal object, producing a more extreme and less diverse emotional landscape. Thus, the negative emotional experience, can be further enhanced by focalism (e.g., Hoerger et al., 2009; Hoerger, 2012; Kahneman et al., 2006; Wilson et al., 2000), making the high level mindset even more vulnerable to the impact bias when making affective predictions.

Method

Participants

The questionnaire were distributed to 81 participants attending introductory courses in sociology and educational sciences at the university of Oslo. Out of the 85 participants, 18 failed to deliver quantifiable estimates (e.g., "a few days"). Four participants were suspected not to make sincere efforts when answering. The extreme values produced by these participants supports this suspicion. Consequently, they were treated as outliers and removed, leaving the total number of participants to be 63 (20 men and 42 women, 1 failed to indicate gender; mean age 25.20 years). The number of excluded cases did not differ in the two temporal distance conditions, ($p = 0.74$).

Materials and procedure

The questionnaire included three separate scenarios that the participants were told to consider: Weekend trip to New York, oral examination at the University of Oslo, and a dating scenario. All scenarios had emotionally negative impact outcomes, and the participants judgements on these considerations were measured. Questionnaires belonging to two temporal distance conditions (time: near future versus distant future) were randomly allocated between students attending the same lectures. An English translation of the weekend trip scenario is presented below. The two conditions are marked by parentheses where they differ in time manipulation (See Appendix C for all three task descriptions).

> *Weekend trip*: Imagine that you (tomorrow/in February 2014) are going on a weekend trip to New York with some good friends. The flight is booked and the hotel situated nearby Grand Central Park is paid for in advance, making the perfect conditions for a memorable weekend to come. However, it turns out that you linger too much before reaching the airport that you miss the plane. You have to stay home.
>
> The day after you miss the plane (tomorrow/February next year), to what extent do you think your general wellbeing will be impacted by this situation? On the next line, a response scale from 1 to 7 with the leftmost label; *a little affected,* while the rightmost label; *extremely affected* were presented. Then, the following question was asked. How much time do you think you will need before the event (tomorrow/next year) will cease to affect your wellbeing? The participants were then instructed to specify a duration estimate on a line below the question.

All participants were given the questionnaire during the break between the first and the second lecture. Participants were told to answer the questions on their own and in the order they

appeared during the 5 min long session.

Results and discussion

The participants were asked to estimate for how long the event would affect their wellbeing before ceasing to exist. The duration estimates were log transformed before they were analyzed. The log scores of the estimates were then converted into z scores and aggregated to form a single index of duration estimates ($\alpha = 0.76$). The z scores revealed higher estimates in the temporally distant condition ($M = 0.28$, $SD = 0.92$), than in the temporally near condition ($M = -0.25$, $SD = 0.61$), $F(1, 61) = 7.35$, $p = 0.009$ confirming the hypothesis (see table 4 for individual log scores).

Table 4
Estimated duration of negative event as a function of temporal distance in three conditions (mean log transformed number of hours; standard deviations in parentheses), Experiment 3.

Task	Near future	Distant future	F	*p*
Weekend trip	1.78 (0.75)	2.50 (1.24)	10.07	0.002
Oral examination	2.51 (1.47)	3.10 (1.65)	1.96	0.168
Passionate date	2.50 (1.40)	3.04 (1.54)	4.14	0.046

Secondly, participants also rated how much impact the emotional event affected their wellbeing. All three tasks were aggregated to form a single index of intensity estimates. The response scale revealed higher intensity scores when induced by temporal proximity ($M = 5.84$, $SD = 0.99$), than when induced by temporal distance ($M = 4.99$, $SD = 1.52$), $F(1, 79) = 8.90$, $p = 0.004$ confirming the hypothesis (see table 5).

Table 5
Intensity scores as a function of temporal distance in three conditions (7 step response scale; standard deviations in parentheses), Experiment 3.

Task	Near future	Distant future	F	*p*
Weekend trip	5.70 (1.32)	5.05 (1.92)	3.17	0.079
Oral examination	6.07 (1.22)	5.34 (1.89)	4.32	0.041
Passionate date	5.74 (1.36)	4.59 (1.89)	10.07	0.002

Lastly, the correlation between the duration estimates and intensity scores were tested (Pearsons bivariate), confirming a relatively minor ($r = 0.25$), but significant dependency $p = 0.046$. Interestingly, the minor correlation between variables is reflected by the fact, that the duration estimates were significantly higher when induced with temporal distance, than when induced with temporal proximity, whereas the intensity scores exhibited the opposite pattern between near future and distant future respectively.

As predicted by the time contraction hypothesis, temporal distance produced an increase in affective durations. Moreover, temporal distance paradoxically produced less emotional impact. This is interesting, since emotional impact is associated with longer affective durations. Research conducted by Verduyn, Delvaux, Van Coillie, Tuerlinckx, & Van Mechelen (2009) studied the relationship between emotional onset and the emotional duration. This was achieved by asking the participants to report their fear, anger, sadness, joy, and gratitude on a daily basis. They found that both the importance of the emotion eliciting situation, and the intensity of the emotion at onset, are key predictors for how long the emotional situation will last. Hence, a strong emotional reaction will linger for a longer period of time before it cease to exist. However, the results display a contradictory pattern between emotional intensity and duration.

Failing to consider the effect of the immune system is the inherent nature of immune neglect (Gilbert et al., 1998; Hoerger et al., 2009). The lower affective durations in the near future condition could be a manifestation of the emotional immune system in action – even though it is not likely, since the distant future condition should be equally affected. Nevertheless, assuming that people are more aware of their specific coping strategies when in a low-level mode, this should decrease the emotional impact and duration. Indeed, the proximal future condition provided lower affective durations, but paradoxically higher emotional distress scores. Thus, immune neglect is unable to account for the contradiction between emotional impact and duration in the proximal future condition (Verduyn et al., 2009). This contradiction necessitates further explanations for understanding the observed pattern of results.

The time contraction hypothesis provides an explanation for the increase of affective durations in the distant future condition. However, it is important to point out that time contraction will only influence affective durations, whereas emotional intensity will not be affected. Time contraction is therefore not bound by the link between emotional intensity and duration. When adopting a high-level mindset the duration estimates were significantly higher ($M = 0.28$, $SD = 0.92$) than when adopting a low-level mindset ($M = -0.25$, $SD = 0.61$). Since time is perceived as contracting when moving up in construal level, the same amount of time units will not suffice to cover the duration of the affective state in the distant future as in proximal future (Kanten, 2011). To

compensate for the contraction of time, the affective durations increase as a function of temporal distance.

The participants responded with significantly higher emotional distress scores in the near future condition, than in the distant future condition. Even though focalism possibly could influence the judgement independent of the temporal distance manipulation, the effect should be expected to be more pronounced in the distant future. This is because moving up in construal is broadening the perspective, highlighting the negative emotional gist of the scenario, while at the same time obscuring the details of the event. The paradox between low emotional intensity, and high affective duration in the distal future remains. The impact bias can therefore not be held accountable for the observed results, without the intervention of time contraction.

Psychological distance has been shown to have a soothing effect of emotional negative events. The distal reflection of a detached high-level mindset, as opposed to the up close and personal ruminations of a low-level mindset. It seems like perceiving the emotional event from a temporal distance makes the people more inclined to reflect on the emotions, instead of personally experiencing the negativity deteriorating your wellbeing (Ayduk & Kross, 2010). However, this explanation encounters the same problems with the contradiction between emotional impact and duration. The emotional detachment of a high-level mindset, cannot account for the observed increase of affective duration estimates in the distant future, highlighting the contradiction between emotional intensity and duration. Once again, time contraction seems to be the needed cause, for being able to explain the observed results in all respects.

Taken together, it seems likely that different mechanisms are at play for obtaining the paradox between low emotional intensity and long affective duration (distal condition), and high emotional intensity and short duration (proximal condition). More specifically, time contraction, emotional detachment, and emotional rationalization processes – in interplay across time conditions, are suggested as possible factors for the contradictory results.

General discussion

Time contraction has proven to be a viable explanation for the observed increase in duration estimates, were other theories have predicted contradictory results. The contraction of time across temporal distance has proven to be a robust phenomena. In line with the time contraction mechanism, duration estimates increased as a function of temporal distance. In all three experiments, the fundamental cognitive process of time perception was affected by construal-level, as a consequence of a temporal distance manipulation. Evidence collected from the first experiment revealed higher duration estimates in the temporally distant condition. This finding was replicated

in the second experiment, where the tolerance for delays provided increasing estimates as a function of distance. Since the task was eliminated, the results provided additional support for time as the mediating factor, and not the perceived enlargement of the task. In the third experiment, affective durations revealed an increase of estimates over temporal distance. Taken together – across the two distinct psychological domains of the planning fallacy and affective forecasting, we have been observing an increase in duration estimates as a function of temporal distance and construal-level. This strengthens the claim that time perception is the mediating factor for the increase. In addition, when projecting tasks into the distant future, no evidence for an increased risk of anchor values was observed. Estimates will be skewed in the direction of the to anchor a significant degree, without interacting with time (experiment 1). Moreover, as predicted by the time contraction mechanism, whether the difference between two estimates will be regarded as similar or dissimilar depends upon a perspective (experiment 2). In the distant future condition the perceived similarity between estimates was greater than in the near future condition.

Apart from the psychological distance dimensions of construal level theory, a multitude of other influences have been found to affect construal level. Many of these factors have not yet have been linked to time perception, such as visual perspective (Libby, Shaeffer, & Eibach, 2009) and positive mood (Labroo & Patrick, 2009). The current experiment used temporal distance exclusively, the above mentioned moderators of construal-level might influence how people judge time as well. For instance, Libby et al. (2009) found a difference in how people construed first-person perspectives as opposed to third-person perspectives when shown photographic content. A first-person perspective promoted low-level construals, whereas seen from the perspective of an observer, induced high-level construals. This suggests that perspective taking could be a viable method for investigating time contraction as well. That is, will people taking a first-person perspective perceive time differently? Furthermore, Roger Buehler et al. (2010) found that visualizing a perspective from a first-person, rather than a third-person perspective produced later completion times. These findings are however not comparable to the present study, since completion times should be treated separately to task duration estimates (Halkjelsvik & Jørgensen, 2012). However, these results suggest the potential value of opening up towards new influences when investigating the effect of time perceptions on duration estimates.

The malleability of subjective time has been observed in past research both in relation to construal level theory as well as in other areas of psychological research. The discussion will explore the concept of time perception in relation to the subjective reference point postulated by construal-level theory. Areas of investigation will center around time perception in relation to affective forecasting, and the planning fallacy. Furthermore, we will discuss how ease or difficulty

of remembering prior experiences could affect future predictions of duration estimates. Research by Sanna and Schwarz (2004) show opposite results to known debiasing techniques, advocating that careful thinking of alternative reasons, and past experiences will hinder the planning fallacy and focalism respectively.

Stimuli and sensation

Logarithms occur in many laws governing human perception. For instance, the Weber-Fechner law proposes an actual versus perceived relationship between stimulus and sensation (Ross, 1997). Discrimination between stimuli increases at a nonlinear pace, as a consequence of the observers habituation to the stimuli. In other words, people desensitizes as additional stimuli is presented, producing a logarithmic relation between the stimulus intensity and the sensation. Past research reveals that also the psychological dimensions of space, time, hypotheticality, and social distance are subject to logarithmic principles, suggesting it to be general phenomena, prevailing in a myriad of psychological contexts. Since construal-level theory postulates that the distance dimensions are interlinked, the reciprocal relation between them implies that a high-level construal on one dimension (e.g., a socially distant relative) will affect the other dimensions in the direction of abstractness and coherency (e.g., a long time ago, in a galaxy far, far away). However, the extent of one dimensions impact on another varies, and will almost certainly not be symmetrical.

The interlinkage between space and time is probably the oldest and most investigated relationship of psychological distance. For instance, DeLong (1981) investigated whether the environment in relation to the size of the observer is mediating temporal duration. Scale-model environments were constructed to represent lounges, with furniture, inhabited with avatars, in the order of 1/6, 1/12, 1/24 of the real size. The participants were then being told to imagine themselves in the environment doing various kinds of previously identified activities, and notify when they *felt* they had been engaged in the activity in the scale model for 30 minutes. Strikingly, the relationship between model size and time perception could predict the estimated interval duration. Participants underwent systematic shifts in experience of time, producing shorter temporal intervals with decreasing model-size. As people are perceiving that their physical surroundings shrink, the perception of time is also subject to contraction.

The reciprocal relation between space and time has been tested in conceptual domains as well. Zäch and Brugger (2008) investigated whether contraction of subjective time relates to the compression of imaginary scaling. Participants were told to imagine a Swiss railway clock filling the entire field of imagery, or representing a coin sized mental image. When imagining the spatially near clockface, there was a slight but nonsignificant underestimation of the duration interval (15

seconds), whereas when imagining the clockface spatially far away, duration intervals were consistently shorter by a second. These results indicate that subjective time seems to run faster during imagination of small sized as opposed to large sized objects. In both the perceptual as well as in the conceptual domain – as one move away from the subjective reference point of the self on the spatial dimension, their reciprocity causes the temporal dimension to contract [1].

Elasticity of time

In the current study we have collected evidence advocating the existence of a time contraction mechanism as a consequence of moving from concrete to abstract construals. The current investigation has been limited to assessing the difference in duration estimates, as a function of construal-level across two points in time; near and distant future. However, the rate of decrease when moving up in construal-level is still an unexplored issue.

When imagining distant places people use more abstract construals. Conversely, an abstract construal will convey a sense of distance. It is however important to point out, that the reciprocal relationship between distance and construal is not necessarily being symmetrical. The effect of changes in construals may be stronger (weaker), than the effect of changes of distance, and vice versa (Henderson, Wakslak, Fujita, & Rohrbach, 2011). This has implications for how we perceive gradual changes in psychological distance, and therefore how we measure different points in time.

A central claim of construal level theory is the postulation of an egocentric reference point defining the here-and-now. When imagining a future event, removal from the present self towards the future will occur, along the temporal dimension. Past research reveals a change in sensitivity in relation to the objective distance from the self. The further away from the reference point will make people increasingly less sensitive along the temporal dimension. Thus, changes in objective distance produce smaller corresponding changes in psychological distance (Trope & Liberman, 2010). In line with this reasoning psychological distance might follow a concave logarithmic function, rather than a linear function.

A linear model of change implies that change start at a certain level of intensity and then increases (decreases) at a relatively constant rate. A logarithmic function starts at a high intensity and may rapidly decrease over several points in time, before leveling out. Therefore, a logarithmic function captures these nonlinear changes, and considers change at different rates over the time period of interest. As it turns out, the logarithmic functional view of time perception, represents a

1 Shrinkage of space results in contraction of time – but not necessarily always in the opposite direction, such that space possibly constitute the most fundamental of the two. Casasanto and Boroditsky (2008) showed the fundamental relationship between space and time existing in our more basic relationship of distance and duration. People are unable to ignore irrelevant spatial information when judging duration, but not the other way around, suggesting that things we cannot perceive with our senses, is built upon the more basic representations of perception and action.

useful model for studying how humans perceive time. Research by Zauberman, Kim, Malkoc, & Bettman (2009) shows that such a function fits the subjective estimates of temporal distance from the future event.

In the present study (experiment 2) temporal distance from the subjective reference point of the self, led to a decrease the sensitivity. Temporal distance induced people to adopt a high-level mindset, and consequently this change of perspective had implications for how the difference between the estimates were to be judged. As Kanten (2011) noted, in the perspective of a years time, an hour seems miniscule and irrelevant, whereas an hour until lunch looms large in the present moment. Therefore, as the temporal distance to the observer increases, the perception of time desensitizes, devaluing the time interval. In practice the, increase of duration estimates, indicate a *contraction* of the length of the time unit, when moving up in construal-level. The relatively tiny deviation between the task duration estimates (e.g., 6 days versus 10 days) appeared more similar, producing greater acceptance for the difference in the distant future.

Further support for the principle of a logarithmic time function was collected by Maglio, Trope, & Liberman (2012), showing that psychological distance reduced sensitivity to any further psychological distance. By representing the target as far away from the egocentric reference point, additional distances are rendered less influential, than when they exist nearby. This was achieved by varying the initial distance from the egocentric reference point of the participants, and subsequently assessing the sensitivity to the second distance. The participants were consistently less sensitive. For instance, in one of their studies they asked the participants how interested they were in visiting a museum situated 27 miles away. When the opening date of the museum was a year from now, they were more interested in visiting, than when it was in a week. Thus, the introduction of temporal distance caused a stretch of spatial distance to subjectively shrink. In turn, this made people more interested in visiting the museum located in a far away space, directly reducing the subjective magnitude of further distances. Thus, experiencing any distance will reduce sensitivity towards any other distance (temporal, spatial, social, or probable), producing *logarithmic* changes. Also, the evidence obtained by Maglio et al. strengthens the account of an interrelation between distances. Any initial psychological distance diminishes cross-dimension sensitivity to any other psychological distance. This can be concluded, because each of the four distance dimensions were used was used as both initial distance, as well as secondary distance. As previously mentioned, traveling from the objectively proximal to the objectively distal part of the continuum, will subjectively diminish the sensitivity towards distance. In the present research this will be reflected as a subjective contraction of time.

Time perception in affective forecasting

The malleability of time also applies to people's affective reactions. Past research reveals that people underestimate both impact and duration of their future emotions. People focus too much on the event, instead of considering the mitigating circumstances. However, the rate of decline of both positive and negative events represents a possible future avenue for research. As previously noted, a wealth of studies show peoples inability to take coping and healing strategies into consideration, thereby producing the durability bias (e.g., Gilbert et al., 1998; Hoerger, 2012). The usual experimental paradigm in affective forecasting examines the accuracy in predictions, by comparing predicted emotions with the actual emotional impact in the present (e.g., Wilson et al., 2000; Wilson & Gilbert, 2003). When people predict their emotional reactions, they do not take into account the speed to which the affective changes takes place.

People's theories about affective reactions changes at a constant rate over a period of time. However, some studies challenge the notions that people's affective reactions decline at a constant rate. Research by Chow, Ram, Boker, Fujita, & Clore (2005) views emotion regulation and affective change over time after non linear thermostatic principles. Furthermore, Finkenauer, Gallucci, Van Dijk, & Pollmann (2007) proposes that people usually overestimate the duration of their affective experience, because they depict it to behave as a linear trend, and underestimate the rate of decline of their affective experience. The observed bias in affective forecasts are peoples's failings to consider the logarithmic nature of affective experiences. This claim was tested by collecting data from people's driver's license examination. To enable assessment of affective durations, it was necessary to map out the difference between a forecast at one point in time, and the actual experience at one of several points in time. The results replicated the impact bias, showing that people overestimated both the intensity and duration of their failings to take the exam. Moreover, people accurately predicted a decrease of their affective reactions over time, but underestimated the speed in which the decrease would occur. A future avenue for improving the accuracy when predicting affective reactions, might be to apply logarithmic principles, by continuing in the lines of Finkenauer et al.

The present research exclusively investigated the intensity and duration of emotional negative events. Future research should look into positive emotions as well. The same trend observed in the third experiment, should be evident for positive emotional reactions, but their intensity and duration may certainly vary from the present findings.

Moreover, time contraction describes the effect of the logarithmic time function as one moves up in construal-level. However, as previously noted, the rate of decline when moving from a low-level to a high-level mindset is still an unexplored issue, with a few exceptions (Finkenauer et

al., 2007; Zauberman et al., 2009). Therefore, future research should try to map the shape of the logarithmic time function more carefully. This could be achieved by projecting tasks at many different points in time, varying the time intervals. The aggregated results would hopefully be able to more accurately reveal the decreasing speed of the logarithmic function. In sum, this could provide a more accurate description how subjective time is perceived in relation to distance and the self.

Accessibility experiences and temporal biases

A common listed error for both affective forecasting and the planning fallacy is to focus too much on a future event or task. For the planning fallacy (Buehler et al., 1994; Kahneman & Tversky, 1977) this leads to overly optimistic estimations for when the task will be completed, whereas for the impact bias (e.g., Wilson et al., 2000; Wilson et al., 2003) this causes overestimation of emotional reactions to future events. Past research explains this bias in people's thinking by assigning a key role to thoughts about focal and alternative events. Prominent researchers in the filed of the planning fallacy claim this is due to taking an inside view – taking a too narrow approach for the plan to succeed, forgetting to take relevant past experiences into consideration. In the case of the impact bias, one of the most cited reasons for mispredictions is to put too much emphasis on the focal event – forgetting to incorporate enough variety to create a sufficiently balanced reality. However, research conducted by Sanna, Schwarz, & Stocker, 2002 and Sanna and Schwarz, 2004 suggests that to consider what people think about, may not provide good enough explanations for the observed biases. Importantly, by emphasizing thought content alone misses the critical point of people's accessibility experiences, or in other words; how easy or difficult something comes to mind.

When people attempt to counter focalism, not only the amount and diversity of the thought content will be necessary, but also the ease of retrieval will be decisive. Any attempt to recall information, renders content that comes to mind, and the subjective ease or difficulty in which the content can be recalled. These feelings of ease or difficulty is referred to as accessibility experiences. Sanna, Schwarz, & Stocker (2002) found that attempts to debias hindsight by thinking about alternative outcomes may backfire. They suggested this had to do with subjective accessibility experiences. Listing many counterfactual thoughts consistently increased the hindsight bias. Presumably, this is due to the experienced difficulty of listing alternative reasons, suggesting that there are not many other ways in which the event might otherwise turn out. This runs counter intuitively to debiasing techniques, advocating that careful thinking of alternative reasons and past experiences will hinder the planning fallacy and focalism respectively. Ease of retrieval therefore

seems to play an influential role. The ease of retrieval account gained additional support from Sanna and Schwarz (2004), by asking participants to either to think of a few, or many reasons, for either a successful or unsuccessful completion of an exam. The results revealed that only listing a few reasons provided the desired effect of attenuating the biases, for both the impact bias, and for future optimism as observed in the planning fallacy. People's temporal judgements will be consistent with what comes to mind, only when it comes to mind easily.

Debiasing techniques which focuses solely on listing reasons cannot account for these observed patterns. In contrast to the expectation, thinking about alternatives attenuate temporal biases, this indicates that debiasing may fail when people try to generate more alternatives than they can easily accomplish. Thus, the research provided by Sanna et al., contradicts much of the research addressing focalism reviewed throughout the paper, such as; unpacking tasks into more manageable parts (Connolly & Dean, 1997), enumerating a future plan (Kruger & Evans, 2004), and reflecting more broadly over daily chores (Wilson et al., 2000), as viable debiasing techniques. Seemingly, there are far from any automaticity for improvement in predicted accuracy for these techniques. Moreover, future research may also explore accessibility experiences in other domains of temporal judgements. To test out how construal-level interacts in the experimental paradigm used by Sanna and Schwarz, could provide interesting new insight into how ease of retrieval interacts with temporal distance.

The time, task distinction

The current study points to the important distinction between time and task perception. The increase in duration estimates over temporal distance has been regarded as evidence for time contraction. As previously explained, when moving up in abstraction, a perceived shortage of time units will arise for covering a task of equal size. Thus, the perceived shortage of time units needed to cover the same task in the distant future as opposed to the proximal future, will amount in the estimator, as if time itself contracts with distance to the observer (Kanten, 2011).

Another possible explanation for this phenomena is that the task itself is perceived to be larger. An observed increase in duration estimates could be caused by the perceived enlargement of the actual task across distance conditions, however the task should only be perceived to expand when moving down to a more concrete mindset. Kruger and Evans (2004) revealed that unpacking a main task into smaller subtasks, provided higher and more accurate estimates compared to the actual outcome. By thinking about how to execute the Christmas shopping (e.g, what gifts to buy to whom), the available information regarding the objective increased. This stands in contrast to just knowing Christmas shopping is going to take place – where the shopper is just concerned about the

overall objective. Thus, even the relatively enduring qualities of the task can enlarge or shrink as a function of construal-level. For instance, Kruger and Evans' (2004) study 1 showed that the participants who listed everyone on their holiday shopping list – compared to those who did not, estimated that their holiday shopping would require 40% more days, 96% more hours, but only 9% more money. It is therefore crucial to point out the possibility of mistakenly taking time as evidence for the increase of duration estimates.

However, we have collected a great deal of evidence for time being the cause. The current experiment provides additional evidence for measuring time by eliminating task altogether, estimating delays (experiment 2), and by introducing estimates on affective durations (experiment 3). In an unpublished study by Kanten (cited in Kanten, 2011), asking people how much money the task was worth revealed no significant difference between construal-level conditions. Paradoxically, even though the same amount of work across time conditions is worth the same amount of payment, and was judged to be equal in scope, people still thinks it will require more time. Furthermore, evidence for time being the mediating factor was supported in Kanten's (2011) study 5, by asking people explicitly about how long they perceived an hour to be. In sum, it seems fair to suggest that it is time, and not task that is the cause of the increase in duration estimates.

People represent future events more abstractly and prototypical than they do represent the proximal future. Perspective taking creates a simplified, abstract mental object, more concerned about the essential qualities of the task than of its underlying constituents. For low-level construals the opposite is true. A concrete mindset will therefore be more attentive towards the various details and idiosyncrasies pertaining to the task. This points to the existence of a mindset to task fit. Inbar et al. (2010) found that people are cued by the features of a task to follow intuition or reason when making a choice. Complex choices elicit a preference of choosing rationally, as well as the opposite, choosing rationally is typically preferred for complex choices. Thus, every task possesses an automatic cognitive fit, such that the task elicits the most appropriate mindset, as much as the other way around. The nature of the task has to maintain a form of complexity and natural segmentation for the low-level mindset to map onto. In line with this evidence Wesp et al. (2009) found that providing concrete details of an event, or priming of a low-level mindset, led people to look less forward to a future positive event, than those who considered the overall gist of the same event. If the purpose is to measure people's perception of time, one should be aware of the vulnerability of abstract thinking. A major challenge is therefore to untangle the type of task providing the ideal basis for estimating time without being too superficial. On the one hand, investigating peoples perception of time requires an abstract mindset. When designing suitable tasks, this should be taken into consideration, since complex tasks “turns” abstract to concrete thinking. On the other hand, a

lot of work related activities will have a certain complexity associated with the task. The right balance must be struck between being of useful ecological validity, while being able to measure time, and not task.

Downstream consequences

Distant future predictions will be vulnerable to the effects of time contraction. Since most of our daily lives centers around time from start until the end of the day, chances are high for encountering activities that will need to take time into consideration. This will have implications for the perceived length of tasks, activities and events, when they are projected into the distant future. There is a high likelihood, that for all kinds of tasks that can easily be perceived coherently as a whole, time will shrink with temporal distance and produce higher duration estimates. In principle, this will most likely apply to all kinds of tasks as long as people are assessing them holistically, and coherently, be it painting a house, Christmas shopping, ordering computer equipment, or writing a summary of a chapter. If the estimation has been carried out with the temporal distance of a year, and the timeframe has been sufficiently emphasized to induce the participants, the estimates will rise. This may seem to be a great way to moderate, and even counter the planning fallacy. Curbing peoples overoptimism with temporal distance, the very "culprit" for peoples underestimations in the first place. However, for the desired effect of time contraction to arise, people needs to adopt a high-level mindset. It therefore seems like areas containing less complexity are well suited for studying time contraction. Affective forecasting seems like a good contender, since emotional states represent intangible feelings with a high level of abstraction, and a low level of complexity.

Predicting one's future emotional states could provide an ideal basis for investigating time contraction, since peoples reactions will be far less detrimental for volatile abstract construals, compared to complex tasks. A high-level mindset concerned about the gist of the event, therefore seems more suitable for judging emotional intensity and duration. When people were questioned about the length of the temporal interval needed – before the event would cease to affect their wellbeing, they estimated longer duration estimates (experiment 3). The induction of a high-level construal will secure sufficient perspective for time contraction to exert its influence, elongating the affective duration. Thus, the durability bias will be further enhanced with sufficient temporal distance to the predictive event. Since time contraction cannot alleviate the durability bias people fall prey to – but to the contrary will enhance it, what good will it do? If the intention is to reduce people's predicted emotional overreactions, some of the previously discussed debiasing techniques needs to be applied. However, affective forecasting can be an important area of research for time perception, because of the evident nature of emotional states from the observers point of view.

Unlike complex tasks, emotions will not be necessary to scrutinize in depth, when predicting their future impact. To the contrary, predictions of future emotional reactions can be executed without much contemplation. Studying how temporal distance interacts with emotional states, can in the long run provide us with an improved understanding of how people perceive time.

Conclusion

In the present study we have been investigating how temporal distance affects predictions of duration estimates. The construal of the presented scenario had a differential impact on the basic cognitive function of time perception. The further away into the future one projects the event – away from the self in the here-and-now, desensitizes the estimators sense of time. When moving up in construal-level, time shrinks at a greater pace than the task does. As a consequence, more time units are needed in the distant future to cover the objectively same task – compared to the present. As a result of the perceived contraction of time, there will be an increase in duration estimates. Furthermore, this effect was observed when estimating task durations, tolerance for delays, and affective durations, suggesting a time related phenomena, since all of the estimates have duration as the common denominator.

Moreover, when projecting tasks into the distant future, no evidence for an increased influence of the anchor values was observed. Estimates will be skewed in the direction of the anchor to a significant degree, without interacting with time. Also, as a consequence of changes in construal-level, one hour in the present will be perceived as a considerable amount of time, whereas within the time horizon of a year, one hour represents a miniscule time interval. Therefore, when comparing two task durations, temporal distance will make them appear more similar, whereas temporal proximity will make them appear more dissimilar. Finally, a possible avenue for future research is to map the desensitization process of time perception as one moves up in construal-level. The rate of decline can be assessed by sampling duration estimates at different points in time. Hopefully, this can contribute to a more accurate description of the behavior of time contraction.

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Appendix A

Near/Distant future condition; high/low anchor condition

Spørreskjema

Denne studien omhandler tidsestimering av arbeidsoppgaver. Datamaterialet fra undersøkelsen vil inngå i min masteroppgave som skrives ved Psykologisk institutt. Spørreskjemaet er frivillig, tar ca. 5 minutter å fullføre og alle svar er fullstendig anonyme. Hvis noen ønsker nærmere informasjon om studien kan de kontakte Thomas Portilla (thomapor@ifi.uio.no).

Mann_____ Kvinne_____

Alder_____

Studium:

Oppgave 1)

Se for deg at du **i morgen**/**en gang neste år** får jobb som forskningsassistent hos professor Olsen. Ditt første oppdrag blir å skrive et sammendrag av et kapittel i en ny bok om andre verdenskrig. Kapittelet er på 30 sider og du har ikke kjennskap til boka på forhånd. Det ferdige produktet skal være ganske nøyaktig 5 sider med skriftstørrelse 12 og med halvannen linjeavstand. Forutsett at du ikke har noe annet å gjøre mens du utfører arbeidet. Du starter på oppgaven **i morgen/22. Januar 2014.**

En tidligere forskningsassistent brukte **5/17** timer på et sammendrag av et annet kapittel i samme størrelsesorden. Vil du trenge mer eller mindre tid enn dette på oppgaven du starter på **i morgen/neste år?**

Mindre___ Mer___ Omtrent det samme___

Hvor mange arbeidstimer ville du *mest sannsynlig* trenge for å gjennomføre jobben?

_____timer

Hvor mange prosent sikker er du på at ditt estimat er riktig pluss minus to timer?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Hvor vanskelig oppfatter du jobben?

veldig vanskelig 1 2 3 4 5 6 7 veldig lett

Hvor stor oppfatter du oppgaven?

veldig liten 1 2 3 4 5 6 7 veldig stor

(fortsettes neste side)

Oppgave 2)

Se for deg at du **i morgen/en gang neste år** blir bedt om å lese korrektur på en artikkel som en kamerat av deg har skrevet om situasjonen i Midtøsten. Artikkelen er skrevet for et nyhetsmagasin og er på 30 sider med skriftstørrelse 12 og men halvannen linjeavstand. Forutsett at du ikke har noe annet å gjøre mens du utfører arbeidet. Du starter på oppgaven **i morgen/22. Januar 2014.**

En annen student, som kameraten din brukte som korrekturleser ved en tidligere anledning, brukte **4/12** timer på en annen artikkel med det samme sideantallet. Vil du trenge mer eller mindre tid enn dette på oppgaven du starter på **i morgen/neste år?**

Mindre___ Mer___ Omtrent det samme___

Hvor mange arbeidstimer ville du *mest sannsynlig* trenge for å gjennomføre jobben?

_____timer

Hvor mange prosent sikker er du på at ditt estimat er riktig pluss minus to timer?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Hvor vanskelig oppfatter du jobben?

veldig vanskelig 1 2 3 4 5 6 7 veldig lett

Hvor stor oppfatter du oppgaven?

veldig liten 1 2 3 4 5 6 7 veldig stor

(fortsettes neste side)

Oppgave 3)

Se for deg at du **i morgen/en gang neste år** påtar deg å gjøre en jobb for en foreleser ved universitetet. Jobben består i å føre inn de siste femti sidene av en gammel dagbok inn på pc. Dagboken er datert til 1955 og er håndskrevet av en norsk sosialantropolog som på den tiden befant seg i Australia hvor han holdt på med et feltarbeid om urbefolkningen. Hver side i dagboken er på størrelse med en A4 side og er ganske tettskrevet, men håndskriften er for det meste tydelig og lett å forstå. Forutsett at du ikke har noe annet å gjøre i tidsrommet du utfører arbeidet. Du starter på arbeidet **i morgen/22. Januar 2014**.

En tidligere forskningsassistent brukte **10/30** timer på å føre inn de første femti sidene av den samme dagboken. Vil du trenge mer eller mindre tid enn dette på de siste femti sidene som du starter på **i morgen/neste år?**

Mindre___ Mer___ Omtrent det samme___

Hvor mange arbeidstimer ville du *mest sannsynlig* trenge for å gjennomføre jobben?

_____timer

Hvor mange prosent sikker er du på at ditt estimat er riktig pluss minus to timer?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Hvor vanskelig oppfatter du jobben?

veldig vanskelig 1 2 3 4 5 6 7 veldig lett

Hvor stor oppfatter du oppgaven?

1 2 3 4 5 6 7

veldig liten veldig stor

Takk for at du deltok!

Near/Distant future condition; control condition

Spørreskjema

Denne studien omhandler tidsestimering av arbeidsoppgaver. Datamaterialet fra undersøkelsen vil inngå i min masteroppgave som skrives ved Psykologisk institutt. Spørreskjemaet er frivillig, tar ca. 5 minutter å fullføre og alle svar er fullstendig anonyme. Hvis noen ønsker nærmere informasjon om studien kan de kontakte Thomas Portilla (thomapor@ifi.uio.no).

Mann_____ Kvinne_____

Alder_____

Studium:

Oppgave 1)

Se for deg at du **i morgen**/**en gang neste år** får jobb som forskningsassistent hos professor Olsen. Ditt første oppdrag blir å skrive et sammendrag av et kapittel i en ny bok om andre verdenskrig. Kapittelet er på 30 sider og du har ikke kjennskap til boka på forhånd. Det ferdige produktet skal være ganske nøyaktig 5 sider med skriftstørrelse 12 og med halvannen linjeavstand. Forutsett at du ikke har noe annet å gjøre mens du utfører arbeidet. Du starter på oppgaven **i morgen/22. Januar 2014.**

Hvor mange arbeidstimer ville du *mest sannsynlig* trenge for å gjennomføre jobben?

_____timer

Hvor mange prosent sikker er du på at ditt estimat er riktig pluss minus to timer?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Hvor vanskelig oppfatter du jobben?

veldig vanskelig 1 2 3 4 5 6 7 veldig lett

Hvor stor oppfatter du oppgaven?

veldig liten 1 2 3 4 5 6 7 veldig stor

(fortsettes neste side)

Oppgave 2)

Se for deg at du **i morgen/en gang neste år** blir bedt om å lese korrektur på en artikkel som en kamerat av deg har skrevet om situasjonen i Midtøsten. Artikkelen er skrevet for et nyhetsmagasin og er på 30 sider med skriftstørrelse 12 og men halvannen linjeavstand. Forutsett at du ikke har noe annet å gjøre mens du utfører arbeidet. Du starter på oppgaven **i morgen/22. Januar 2014.**

Hvor mange arbeidstimer ville du *mest sannsynlig* trenge for å gjennomføre jobben?

_____timer

Hvor mange prosent sikker er du på at ditt estimat er riktig pluss minus to timer?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Hvor vanskelig oppfatter du jobben?

veldig vanskelig 1 2 3 4 5 6 7 veldig lett

Hvor stor oppfatter du oppgaven?

veldig liten 1 2 3 4 5 6 7 veldig stor

(fortsettes neste side)

Oppgave 3)

Se for deg at du **i morgen/en gang neste år** påtar deg å gjøre en jobb for en foreleser ved universitetet. Jobben består i å føre inn de siste femti sidene av en gammel dagbok inn på pc. Dagboken er datert til 1955 og er håndskrevet av en norsk sosialantropolog som på den tiden befant seg i Australia hvor han holdt på med et feltarbeid om urbefolkningen. Hver side i dagboken er på størrelse med en A4 side og er ganske tettskrevet, men håndskriften er for det meste tydelig og lett å forstå. Forutsett at du ikke har noe annet å gjøre i tidsrommet du utfører arbeidet. Du starter på arbeidet **i morgen/22. Januar 2014**.

Hvor mange arbeidstimer ville du *mest sannsynlig* trenge for å gjennomføre jobben?

_____timer

Hvor mange prosent sikker er du på at ditt estimat er riktig pluss minus to timer?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Hvor vanskelig oppfatter du jobben?

veldig vanskelig 1 2 3 4 5 6 7 veldig lett

Hvor stor oppfatter du oppgaven?

1 2 3 4 5 6 7

veldig liten veldig stor

Takk for at du deltok!

Appendix B

Near future condition

I dette spørreskjemaet blir du bedt om gjøre noen vurderinger knyttet til tidsestimater. Dataene skal brukes i et større prosjekt om prediksjoner ved psykologisk institutt, UiO. Spørreskjemaet tar ca. 5 minutter å gjennomføre. For Nærmere informasjon om prosjektet kan du kontakte postdoktor Alf Børre Kanten. a.b.kanten@psykologi.uio.no.

Mann ___ Kvinne___ alder____

1.
Se for deg at du *i morgen* bestemmer deg for å leie inn en håndverker for å gjøre en oppussingsjobb på kjøkkenet ditt. Du tar kontakt med to ulike håndverkere. Den ene, Pål, mener jobben vil ta 6 arbeidsdager. Den andre, Per, mener jobben vil ta 10 arbeidsdager. Begge sier de kan starte jobben om et par dager fra nå**.**

I hvilken grad vil du si Pål og Per sine estimater avviker fra hverandre (sett et kryss på linja)?

6 versus 10 arbeidsdager på jobben du bestiller i morgen

estimatene er rimelig like <——————————————> estimatene er ganske forskjellige

Det viser seg at Per uansett ikke kan påta seg arbeidet, og jobben går til Pål. Noen dager ut i jobben en uke fra i dag, viser det seg at jobben går saktere enn planlagt og du må regne med at Pål blir noe forsinket utover de estimerte 6 dagene.

Hva vil du si er den minste forsinkelsen som må regnes som en betydelig forsinkelse på håndverkerjobben du bestiller i morgen?

_____arbeidsdagers forsinkelse

2.
Forestill deg at du *i morgen* er på utkikk etter en ny bærbar pc. Du søker litt på nettet og finner to firmaer som kan levere akkurat den PC'en du er ute etter. Det ene firma, Tech, mener de kan levere maskina på 8 virkedager. Det andre firmaet, Cyber, kan levere den på 13 virkedager fra i morgen.

I hvilken grad vil du si estimatene fra Tech og Cyber avviker fra hverandre?

8 versus 13 virkedagers leveringstid på bestillingen i morgen

estimatene er rimelig like <——————————————> estimatene er ganske forskjellige

På grunn av litt mer gunstig pris velger du Cyber som kan levere PC'en på 13 virkedager. Du bestiller maskina i morgen. Etter et par dager får du beskjed om at noe forsinkelse må påregnes.

Hva vil du si er den minste forsinkelsen som må regnes som en betydelig forsinkelse på bestillingen du gjør i morgen?

____virkedager forsinkelse

Snu arket

3.
Forestill deg at du *i morgen* trenger en ny bok som er en del av et pensum på et kurs du tar ved universitetet. Det viser seg at bokhandelen ved universitetet ikke har den inne, men kan bestille den for deg. De forteller at de kan skaffe boka på 7 virkedager. Du sjekker en nettbutikk, men de sier at de ikke kan levere boka før etter 12 virkedager fra i morgen.

I hvilken grad vil du si estimatene fra bokhandelen og nettbutikken avviker fra hverandre?

7 versus 12 virkedagers leveringstid på bestillingen i morgen

estimatene er rimelig like <——————————> estimatene er ganske forskjellige

Du velger bokhandelen som kan levere boka på 7 virkedager, og boka bestilles midt på dagen i morgen. Etterhvert blir det imidlertid klart at boka blir noe forsinket.

Hva vil du si er den minste forsinkelsen som må regnes som en betydelig forsinkelse på bestillingen du gjør i morgen?

____virkedager forsinkelse

Takk for at du deltok!

Distant future condition

I dette spørreskjemaet blir du bedt om gjøre noen vurderinger knyttet til tidsestimater. Dataene skal brukes i et større prosjekt om prediksjoner ved psykologisk institutt, UiO. Spørreskjemaet tar ca. 5 minutter å gjennomføre For Nærmere informasjon om prosjektet kan du kontakte postdoktor Alf Børre Kanten. a.b.kanten@psykologi.uio.no.

Mann ___ Kvinne___ alder____

1.
Se for deg at du i *februar 2014* bestemmer deg for å leie inn en håndverker for å gjøre en oppussingsjobb på kjøkkenet ditt. Du tar kontakt med to ulike håndverkere. Den ene, Pål, mener jobben vil ta 6 arbeidsdager. Den andre, Per, mener jobben vil ta 10 arbeidsdager. Begge sier de kan starte jobben i februar neste år.

I hvilken grad vil du si Pål og Per sine estimater avviker fra hverandre (sett et kryss på linja)?

6 versus 10 arbeidsdager på jobben du bestiller neste år

estimatene er rimelig like <——————————————> estimatene er ganske forskjellige

Det viser seg at Per uansett ikke kan påta seg arbeidet, og jobben går til Pål. Noen dager ut i jobben i februar 2014, viser det seg at jobben går saktere enn planlagt og du må regne med at Pål blir noe forsinket utover de estimerte 6 dagene.

Hva vil du si er den minste forsinkelsen som må regnes som en betydelig forsinkelse på håndverkerjobben du bestiller neste år?

_____arbeidsdagers forsinkelse

2.
Forestill deg at du i *mars neste år* er på utkikk etter en ny bærbar pc. Du søker litt på nettet og finner to firmaer som kan levere akkurat den PC'en du er ute etter. Det ene firma, Tech, mener de kan levere maskina på 8 virkedager. Det andre firmaet, Cyber, kan levere den på 13 virkedager i mars 2014.

I hvilken grad vil du si estimatene fra Tech og Cyber avviker fra hverandre?

8 versus 13 virkedagers leveringstid på bestillingen neste år

estimatene er rimelig like <——————————————> estimatene er ganske forskjellige

På grunn av litt mer gunstig pris velger du Cyber som kan levere PC'en på 13 virkedager. Du bestiller maskina 3. mars 2014. Etter et par dager du får beskjed om at noe forsinkelse må påregnes.

Hva vil du si er den minste forsinkelsen som må regnes som en betydelig forsinkelse på bestillingen du gjør neste år?

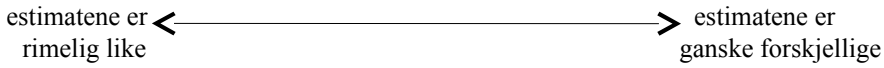
____virkedager forsinkelse

Snu arket

3.
Forestill deg at du i *januar 2014* trenger en ny bok som er en del av et pensum på et kurs du tar ved universitetet. Det viser seg at bokhandelen ved universitetet ikke har den inne, men kan bestille den for deg. De forteller at de kan skaffe boka på 7 virkedager. Du sjekker en nettbutikk, men de sier at de ikke kan levere boka før etter 12 virkedager i januar 2014.

I hvilken grad vil du si estimatene fra bokhandelen og nettbutikken avviker fra hverandre?

7 versus 12 virkedagers leveringstid på bestillingen neste år



Du velger bokhandelen som kan levere boka på 7 virkedager, og boka bestilles midt på dagen 13. januar 2014. Etterhvert blir det imidlertid klart at boka blir noe forsinket.

Hva vil du si er den minste forsinkelsen som må regnes som en betydelig forsinkelse på bestillingen du gjør neste år?

____virkedager forsinkelse

Takk for at du deltok!

Appendix C

Near future condition

I denne studien er vi interessert i hvordan folk reagerer på ulike hendelser. Datamaterialet fra undersøkelsen vil inngå i min masteroppgave som skrives ved Psykologisk institutt. Undersøkelsen er frivillig, tar ca. 5 minutter å fullføre og alle svar er fullstendig anonyme. Hvis noen ønsker nærmere informasjon om studien kan de kontakte Thomas Portilla (thomapor@ifi.uio.no).

Mann_____ Kvinne_____ Alder_____

1)
Forestill deg at du *i morgen* skal på en helgetur til New York sammen med noen gode venner. Flybilletten er kjøpt og hotellet ved Grand Central Park er bestilt, alt er tilrettelagt for en minneverdig helg. Det viser seg imidlertid at du somler såpass mye med å komme deg avgårde til flyplassen at du ikke rekker flyet. Du må dermed bli hjemme.

Hvordan tror du ditt generelle velvære vil være påvirket av denne hendelsen i overmorgen?

Lite påvirket 1 2 3 4 5 6 7 Ekstremt påvirket

Hvor lang tid tror du det vil gå før hendelsen i morgen vil slutte å påvirke ditt generelle velvære?
(Angi varigheten på linja under)

_____

2)
Se for deg at du *i morgen* skal opp til muntlig eksamen i et bacheloremne du tar på universitetet. Du har forberedt deg bra og mestrer nesten alle deler av pensum meget godt. Dessverre kommer du opp i en del av pensum du ikke kan noe særlig om. Uflaksen kombinert med eksamensnerver gjør at du alt i alt gjennomfører en særdeles dårlig eksamen som resulterer i en elendig karakter i faget.

Hvordan tror du ditt generelle velvære vil være påvirket av denne hendelsen i overmorgen?

Lite påvirket 1 2 3 4 5 6 7 Ekstremt påvirket

Hvor lang tid tror du det vil gå før hendelsen i morgen vil slutte å påvirke ditt generelle velvære?
(Angi varigheten på linja under)

_____

3)
Forestill deg at du *i morgen* skal på date med en flamme du i lengre tid har vært betatt av. De seneste møtene mellom dere har vært både intense og hyggelige på en og samme tid, og du føler at det bare er et tidsspørsmål før dere blir sammen. Kvelden er godt i gang og stemningen er god helt til du blir fortalt at hun/han har bestemt seg for å gjøre et nytt forsøk med eksen, men håper likevel at dere kan fortsette å være venner.

Hvordan tror du ditt generelle velvære vil være påvirket av denne hendelsen i overmorgen?

Lite påvirket 1 2 3 4 5 6 7 Ekstremt påvirket

Hvor lang tid tror du det vil gå før hendelsen i morgen vil slutte å påvirke ditt generelle velvære?
(Angi varigheten på linja under)

_____

Takk for at du deltok!

Distant future condition

I denne studien er vi interessert i hvordan folk reagerer på ulike hendelser. Datamaterialet fra undersøkelsen vil inngå i min masteroppgave som skrives ved Psykologisk institutt. Undersøkelsen er frivillig, tar ca. 5 minutter å fullføre og alle svar er fullstendig anonyme. Hvis noen ønsker nærmere informasjon om studien kan de kontakte Thomas Portilla (thomapor@ifi.uio.no).

Mann_____ Kvinne_____ Alder_____

1)
Forestill deg at du *i februar 2014* skal på en helgetur til New York sammen med noen gode venner. Flybilletten er kjøpt og hotellet ved Grand Central Park er bestilt, alt er tilrettelagt for en minneverdig helg. Det viser seg imidlertid at du somler såpass mye med å komme deg avgårde til flyplassen at du ikke rekker flyet. Du må dermed bli hjemme.

Dagen etter at du ikke rekker flyet i februar neste år, hvordan tror du ditt generelle velvære vil være påvirket av denne hendelsen?

Lite påvirket 1 2 3 4 5 6 7 Ekstremt påvirket

Hvor lang tid tror du det vil gå før hendelsen neste år vil slutte å påvirke ditt generelle velvære?
(Angi varigheten på linja under)

_____

2)
Se for deg at du *våren 2014* skal opp til muntlig eksamen i et bacheloremne du tar på universitetet. Du har forberedt deg bra og mestrer nesten alle deler av pensum meget godt. Dessverre kommer du opp i en del av pensum du ikke kan noe særlig om. Uflaksen kombinert med eksamensnerver gjør at du alt i alt gjennomfører en særdeles dårlig eksamen som resulterer i en elendig karakter i faget.

Dagen etter eksamen våren neste år, hvordan tror du ditt generelle velvære vil være påvirket av denne hendelsen?

Lite påvirket 1 2 3 4 5 6 7 Ekstremt påvirket

Hvor lang tid tror du det vil gå før hendelsen neste år vil slutte å påvirke ditt generelle velvære?
(Angi varigheten på linja under)

_____

3)
Forestill deg at du *i mars neste år* skal på date med en flamme du i lengre tid har vært betatt av. De seneste møtene mellom dere har vært både intense og hyggelige på en og samme tid, og du føler at det bare er et tidsspørsmål før dere blir sammen. Kvelden er godt i gang og stemningen er god helt til du blir fortalt at hun/han har bestemt seg for å gjøre et nytt forsøk med eksen, men håper likevel at dere kan fortsette å være venner.

Dagen etter daten i mars neste år, hvordan tror du ditt generelle velvære vil være påvirket av denne hendelsen?

Lite påvirket 1 2 3 4 5 6 7 Ekstremt påvirket

Hvor lang tid tror du det vil gå før hendelsen neste år vil slutte å påvirke ditt generelle velvære?
(Angi varigheten på linja under)

_____

Takk for at du deltok!